THE

# JOURNAL OF GAS LIGHTING,

## WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. X. No. 239—13th YEAR.] LONDON, DECEMBER 17, 1861. [Subscription per Ann. { 15s. in Advance / 18s Credit. ] Price 8d. Unstamped.

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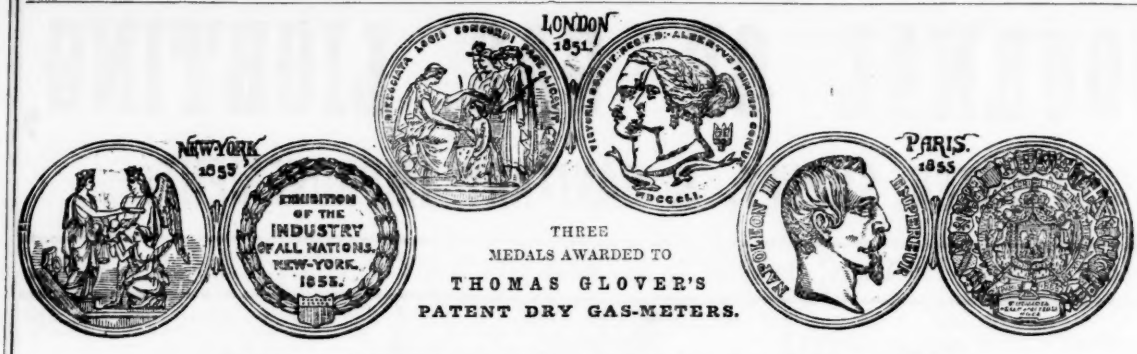


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PATENT DRY GAS-METERS.

# LORD REDESDALE'S "SALE OF GAS ACT."

## DRY METERS *VERSUS* WET METERS.

*LONDON, February* 25, 1861.

THOMAS GLOVER begs to call the attention of Gas Companies and others to a few *facts*, which, if duly considered, must lead to most important conclusions:—

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## TO CORRESPONDENTS.

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## NOTICES.


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Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

This JOURNAL has been duly registered at the General Post Office for transmission abroad.

All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

# THE JOURNAL OF GAS LIGHTING, WATER SUPPLY, & SANITARY IMPROVEMENT.

*TUESDAY, DECEMBER* 17, 1861.


## NOTES UPON PASSING EVENTS.

THE death of the Prince Consort comes upon us all like a thunderclap. It was but the other day that he was presiding over the Royal Agricultural Society—the last of the several societies which, in the course of twenty years, he has honoured and assisted. It was but the other day that he was bringing his clear views and strong common sense to bear on the complicated arrangements of his favourite idea, the great International Exhibition of 1862; and now, all is over, and nothing is left of that accomplished prince and gentleman but dust and ashes. As usual in history, we begin to appreciate when we have finally lost the friend, the patron, the earnest student of science, and art, and literature. He was the first royal prince, within nearly three hundred years (with the doubtful exception of the Duke of Sussex), who was really devoted to intellectual pursuits, who had really had the advantage of a scientific education, who had a taste for a high class of art, and could converse with men of science on their special studies in a manner worthy of the subject, whether it was natural or mental philosophy, whether it was mechanics or agriculture. The Prince was not only an accomplished, highly-educated man, who read and studied much, and observed carefully everything bearing on his favourite studies, but he had an original tone of mind—he never spoke upon an important occasion without giving his hearers something worth remembering to carry away. A few years ago, the Prince Consort's speeches were collected and published. In turning them over, it is astonishing to find how much original suggestive thought there is in them, whether he was addressing Lincolnshire farmers, or a learned society, or a City company. Since that publication, His Royal Highness became the president of the British Association for the Advancement of Science, and delivered an address, second only to similar productions of one or two men of genius—an address full of knowledge, not got up for the occasion, but the overflowings of a wisely-directed education, and full of suggestion. His favourite studies being art and science, his relaxation was agriculture, which he pursued in the simple, earnest, unostentatious manner, most likely to be useful by example. The address of His Royal Highness was not genial, and he was not so popular as other princes, far his inferior in intellect and honesty of purpose, have temporarily been. He sometimes pressed his favourite ideas and plans for the advancement of art and science further than the public were prepared to admit; but, looking back on his career of twenty years residence in this country, even those who sometimes opposed his views, must and will freely admit that the public as well as the private life of the Prince Consort has been, in the highest degree, honourable to himself and useful to this country. The Exhibitions of 1851 and 1862, the revival of the Society of Arts, the British Association Meeting of 1859, the foundation of the Schools of Design at South Kensington, and several not unimportant reforms in the Royal Agricultural Society, will be indelibly connected with the name of the Prince Consort. It is impossible to estimate how much the higher classes have gained, during the last twenty-two years, by seeing next to the Throne one who, instead of being devoted to idle, and frivolous, and vicious pursuits, found his chief pleasures out of the serious business of his life, in books and works of art, in horticulture and agriculture, and in the study and encouragement of science—of one who never lost an opportunity of expressing his interest in, and appreciation of, the intellectual progress of the world.

The Institution of Civil Engineers has, for two successive evenings, been engaged in hearing and discussing a paper by by Mr. Bailey Denton on "Arterial Drainage." The discussion has been adjourned to the first meeting in the new year, in order that the Institution may have the benefit of the experience and opinions of Mr. Hawksley and of Mr. G. P. Bidder, who will then, to use his own words, leave the chair to Mr. Hawkshaw, and join the democracy on the benches. The subject is of an essentially practical character and one which, in the course of a very few years, has, almost imperceptibly, acquired national importance. It is, in fact, an element of the food question. A very large per centage of our future supply of corn and meat depends on draining some twenty millions of acres of their superfluous moisture. This cannot be done without flooding, in rainy seasons, thousands of acres which are now dry; or, improving the old or creating new outfalls. Systematic agricultural drainage is founded on a modern theory, which has but very recently, speaking historically, been carried into practical effect. Great drainage operations were carried out between two and three hundred years ago in Holland, in Flanders, and in our own Lincolnshire, Cambridgeshire, and Bedfordshire, by Flemish engineers and their pupils. But there was very little similarity between the effects of the ancient fen and the modern agricultural drainage operations. Fen drainage was carried out, in order to convert into pasture or arable use land which was previously, for the greater part of the year, if not permanently, covered

with water—such soil being usually of a peaty or purely alluvial character. And if by open drains, or pumping operations, or the addition of fresh soil to the reclaimed land, it could be rendered dry enough for sowing and reaping, or mowing, the work was done, and the saturation of the soil in winter, or even its being covered with ice, was not, in consequence of its porous, friable character, a serious drawback. Although agricultural drains have been made in clay countries, with turf, and hedge-cuttings, and stones, more than a hundred years ago, these drains were executed under the idea of carrying off the surface water, like the drains on the roof of houses. With this view, fields were laid into ridges and intersected with open channels. In a rainy season, the zealous farmer would go forth with his spade and clear out the little shallow channels amidst his standing corn. About twenty years ago, the theory that water rises from below in every retentive soil, now universally accepted, was first propounded, that the object of drainage was to prevent the permanent table of water which exists under retentive soils from rising within three or four feet of the surface, and that if this was done, and the land was properly cultivated, the upper crust even of the most retentive soils would eventually acquire a sufficiently porous character to allow the greater part of the rainfall to pass through to the drains, without lodging. This theory was not accepted without hot discussions. But experiences, on the largest scale, proved that when a retentive soil had been efficiently drained, the agricultural upper crust, cleared of stagnant water, became warmer, and gave earlier and better crops under the influence of the air, and of the flow of rain bringing air with it. Manure, too, was washed down instead of being washed away. There were, and are formidable difficulties in the way of the adoption of systematic agricultural drainage; first, the landowners and farmers had to be convinced of the profitableness of the new system; next, the money for executing it, amounting to between £5 and £6 an acre, had to be found; and, lastly, some mode of breaking up retentive soils cheaper and more effective than horse-power was needed. The first drains were made with broken stones. It was not until 1844 that the invention of the horizontal tile draining-machine, now to be found in every agricultural parish, rendered it possible to produce draining tiles in unlimited numbers at a cheap rate. In 1846, in order to support the landed interest during the depression that attended the repeal of the Corn Laws, Sir Robert Peel carried the first Act for lending two millions of money to landowners, to be repaid by a rent-charge, spread over a series of years, which covered both interest and principal, and took precedence of all other incumbrances. The Government sanction, thus given to the Parksian system of draining, converted a good many noblemen and gentlemen; and, during the years of agricultural distress, many landowners drained farms of retentive soils, instead of reducing rent, or assisted farmers by paying them for carting draining-tiles on to their land. Landowners with surplus capital followed the lead set by the Government, and drained their own estates at their own expense. In spite of the mistakes of execution, inevitable on the introduction of a new system, and in spite of a discussion which, now ended, long raged between the advocates for the deep drainage required under the Government loan, and the shallow drainage recommended by old Essex and some Scotch farmers, the body of agriculturists became gradually impressed with the advantage of getting thirty to forty inches of soil through which the air could penetrate and the rain filter. Before the first two millions were repaid, an Act granting a second loan of like amount was passed. Several companies were formed for executing drainage and permanent agricultural improvements by loans, to be repaid by a rent-charge, which took precedence of all other charges, and was quite independent of all questions of title. Finally, the Private Moneys Drainage Act enabled a landowner to obtain money from any available source, and makes its repayment a first charge upon lands of inheritance, or to lay out his own capital in draining an estate in which he has a life interest, and to appropriate a rent-charge representing the capital and interest in any manner he chooses, either by will or deed. Thus, by one operation, he could improve his estate, invest spare capital on undeniable security, and provide for younger children. The agricultural public, having, in the course of twenty years, but chiefly in the course of the last ten years, been convinced of the profitableness of the systematic drainage of retentive soils, and the legal difficulties, which are usually such a tax on all transactions in the way of investing or borrowing money on land, having been almost entirely removed, a new impetus was given to the cultivation, and consequently to the deep drainage of clay lands, by the invention of economical modes of steam cultivation. Thus, we shall commence the agricultural year of 1862 with a million acres drained on a system which was unknown in 1840, and violently opposed in 1850, with new powers and temptations for investing capital in drainage operations—a new value to the most retentive soils in the powers of steam cultivation—and twenty million acres which would repay the whole cost of draining, in some instances, in one season, in most instances in eight years, and more frequently within five years. In every drainable district, instances are to be found where 15s. an acre have been turned into 30s. an acre; and, near great manufacturing towns of the north, 1s. an acre of moorland into 40s. an acre of accommodation pasture, by judicious drainage. With these elements and stimulants to encourage agricultural drainage, and with the fact that money expended on drainage operations does not remain plant fixed in the soil, yielding low interest, but speedily returns its capital cost, it may be fairly anticipated that the next twenty years will see, not one but many million acres of retentive soils reduced to a porous condition, by the combined action of deep gridiron drainage and deep steam cultivation. This brings us to the probable effect on the brooks, and rivers, and estuaries, which now receive, at distant uncertain intervals, the rain which falls on drained agricultural land. In order to explain this question to those who have hitherto paid but little attention to it, it may be useful to show the effect of rainfall on three different descriptions of soil into which agricultural England may, for convenience, be divided. First, there are the naturally drained lands, resting on a porous subsoil, of which chalk is the best representative. The rainfall sinks at once, passes through as if it were a filter-bed, and disappears below the influence of evaporation. Thus, in chalk counties, a thunder-storm will in a very brief space swell an insignificant spring at the foot of a hill into the source of a great flood. Yet, within twenty-four hours, the surface soil will be perfectly dry. Next, take what agricultural drainers call *free* soils; where a deep upper crust is more or less porous, and the subsoil of clay or gravel retains the rainfall which, in undrained land, will rise in a wet season until it saturates the whole soil to the surface. Thirdly, there are the plastic clays, which are of the same consistence all through, which are saturated with water in wet seasons, and baked to the consistence of brick during hot weather. In *free* soils, by occasional drains, arranged as experience and experiment may suggest, you endeavour to lower the water below the reach of evaporation, but, not below a level at which the descending roots of crops may draw the moisture they require; remembering always that whatever may be the level of the drains in dry weather, the table of water will rise some what above them by capillary attraction. It is in free soils that what is called over-draining sometimes takes place. When, for instance, a drain pierces a bed of clay or gravel that has pounded up an accumulation of water—just as if, after laying a sponge in a saucer, with the intention of making it half wet, you made a hole in the saucer; the sponge would, of course, become quite dry, and unfit to grow the schoolboy's crop of mustard and cress. A sponge laid in a shallow saucer is an illustration of the condition in which we desire agricultural land to be—dry at top, with a supply of water ready to rise at the bottom. Homogeneous clay soils receive more or less of each shower of rain until fully saturated, when all further rainfall must pass away on the surface, because, when once saturated, they cannot drain away like land with a porous subsoil, or drain away by degrees like free soils, but are only dried by evaporation. When fully saturated, rain flows away from the surface of clays, as it flows from the roof of a slated house. Thus, where a tract of country is quite undrained and saturated with water, rainfall beyond a certain amount flows away from the surface, until it gorges the nearest brook or river, and causes a flood. But, if a district is thoroughly drained, the retentive clay-land approaches, to a certain extent, to the character of a filter; the rain, instead of passing off the surface, passes through the earth, and reaches the outfalls in a different way. The same effect is produced still more rapidly in free soils, and the consequence is, that the delay which formerly occurred after a dry season, while the thirsty soil was taking its full dose of rain, no longer takes place, and what are called the arterial drains of the country are overflowed with unaccustomed force and rapidity. But Mr. Bailey Denton, in his

paper at the Institution of Civil Engineers, maintained that draining increased the volume and force of floods in a manner not hitherto suggested—that is, not only by giving to streams through the subterranean pipe-drains the volume of water that hitherto had rolled slowly over the surface of the land, but by feeding the perennial springs, rising chiefly in free soils, with water that had hitherto passed off by evaporation. Under a perfect system of drainage and cultivation, the least possible quantity of water rests on the surface of the land—the greater portion passes off at once as through a filter—especially as land is usually bare of crops at the seasons when rain showers are most continuous. Mr. Denton quoted the experiments of Mr. Charnock, to show how large a proportion of rainfall was carried off by evaporation in saturated soils. We must, therefore, be prepared to find the two operations of gridiron deep drainage and steam cultivation carried out with great vigour during the next ten years, on the most retentive clay soils, which are also the best corn-growing soils; and, consequently, must expect that the brooks and rivers which form the arterial drains of the drained districts will be filled during and after rainy seasons, not only with greater rapidity, but with a greater volume of water than heretofore. If Mr. Denton's evaporation theory be correct—and we are strongly inclined to think that it is—perennial springs which feed rivers will be themselves fed by several inches of rainfall, withdrawn by drainage from the influence of evaporation. The City of London and the river Thames afford a parallel instance. At one time, the Thames received only the surface drainage of rainfall and the drippings from the soil. But, by degrees, as the sewer system was established, and the consumption of water increased, all the water consumed for domestic purposes was conveyed, with the sewerage, through direct conduits, to the river, until the extent of the evil compelled the metropolis to spend three millions in making subterranean canals to carry away what once was sufficiently provided for in the open street gutters. The brooks and streams of England, over-taxed by agricultural drainage, will eventually require the same kind of attention. The Land Drainage Act of last session—of which we gave an analysis in our "Notes" of the 24th of September—is a step in the right direction; but we are still at sea, for want of correct information. We have lying before us an elaborate map of the rivers of England, issued by the Salmon Fisheries Commission. The improvement of arterial drainage would be enormously facilitated, if the country were examined by a commission of qualified engineers, and a map issued, in which the districts were defined in which outfalls might be most economically improved. Such a report and map would be a guide to great landowners, and would have a useful influence in obtaining a majority of assents to judicious improvements. Of course, we take it for granted that the commission would be formed of men of character and engineering reputation, like those on submarine telegraphs and on the Thames embankment; and that its duration would be limited, and its objects clearly defined; that it would be appointed, not to execute works, but collect and digest geographical, geological, and engineering information. The present body of drainage inspectors, appointed at a time few knew or cared anything about agricultural drainage, are, with two or three exceptions, miserably inefficient, without any real knowledge either of agriculture or engineering. One gentleman, lately deceased, and not by any means the worst, was educated as a merchant, failed as a broker, did not succeed as a fancy farmer, and was provided for as a drainage inspector. The magnitude of the arterial drainage works which must shortly be undertaken will make them worth the attention of the rising generation of civil engineers, who are unfortunately living in the post-railway age, and cannot expect the ample supply of loaves and fishes which fell to the shares of their predecessors.

The following information on the progress of steam cultivation, naturally follows our sketch of the progress of agricultural drainage. The merits of Messrs. Fowler's steam plough are well known, and have been acknowledged more than once by the Royal Agricultural Society; but, the steam cultivator of Messrs. Howard, of Bedford, appears to have come more widely into use, as a standard machine amongst tenant farmers, without the reward of prizes. A pamphlet just issued contains twenty-seven letters, from as many farmers and stewards, in eighteen different counties, all dated this year and all giving, in distinct terms, the reasons why they prefer steam power to horse power. We find one farmer has cultivated a 50-acre field without moving either engine or windlass, and has worked 2000 acres with one steel rope. A second, has cultivated 250 acres since June, and calculates that he has been saved the keep and price of fourteen horses in the six months. A third, who has cultivated 144 acres for himself, and 100 acres for his son, calculates the cost per acre at 6s. 6d., including per centage on capital, wear and tear (estimated at 25 per cent.), cost of manual labour, coal, water, and oil, or cost of working, 45s. per day, the average of daily work being from seven to eight acres. A fourth, has cultivated 450 acres, without a single breakage, at the rate of seven acres a day, 8 inches deep; the land, hard, having had very little rain. A fifth—Mr. Thomas Wagstaff, of Hall Farm, near Peterborough—says, "I cultivated upwards of 70 acres twice over, in a manner that no horse-drawn implement could have done. The soil was a stiff clay, in some parts very strong. One of my men laughed at the idea of trying the cultivator on these steep hill-sides, saying he was sure we should tumble over it ten times a day. On trial, we found no difficulty; the implement kept its course straight across the field, which was twenty chains long, and broke up the land at remarkably even depth. I hope next year to use it four times as much." A sixth, adopted steam cultivation "because the expenses of horses on his 400-acre clay farm were gradually on the increase. Much work had often to be done in the worst of weather; *so the benefit of the three-feet drains was partly neutralized by the horses feet.*" In different instances, steam cultivation has enabled farmers to sell, or send to fatten, twelve oxen, six oxen, and three horses, and six horses. These extracts may do something towards convincing non-agriculturists that steam cultivation has been accepted as a profitable fact by the farmers of England. Indeed, several hundred sets of machinery have been sold, and are at work in the United Kingdom. At the Smithfield Club dinner, a startling fact was mentioned by the president, on the authority of an eminent cattle salesman: "One-fourth of the cattle sold in the metropolitan market are imported from the continent." No wonder that meat is dear in France and Germany north and south, with such competition open.

The commissioners on the Thames Embankment have been re-appointed to consider the propriety of embanking the southern side. Such an extension of the plan would be a grand addition to the beauty of the Thames, and make the work complete. It is not required for the sewer or for a thoroughfare; as, when the northern embankment road is made, and the new street to the Borough is finished, there will be two straight routes open from Westminster to both ends of London Bridge. But a southern embankment would be valuable in a sanitary point of view, and add to the value of the south side manufactories, by increased wharfage room, and facilities for loading and unloading at all times of the tide. As the reappointment of the commission is due entirely to pressure—perfectly justifiable pressure—from the political leaders of Lambeth and Southwark; and as the embankment—putting compensation on one side—must be a very costly work, it would be only a fair test of the patriotic sincerity of the south side manufacturers for the commission, to ask them if they will consent to a commission, instead of a jury, to arbitrate on their claims to compensation? or, better still, will they adopt Sir Morton Peto's suggestion, and adjourn the consideration of compensation until the completion of the work proves whether any damage at all has accrued by making the embankment for which they have themselves petitioned? The north side wharfingers opposed the embankment scheme tooth and nail.

Captain Fowke's design for the Great Exhibition has recently been the subject of a sharp debate at the Society of Arts, and of a very amusing speech from Mr. Henry Cole, C.B. To discuss the merits of Captain Fowke's plan at the present moment, when it is in course of execution, and not completed, is a waste of time. If it is as good as his friends believe, it will require no defenders when the building is open. Architects have laid themselves open to Mr. Cole's sarcasms, by constantly sacrificing everything to exterior appearance. No matter whether it is a town-hall, or a nobleman's mansion, or a merchant's villa, or a great hotel, it is ten to one but convenience, comfort, and fitness, are all made secondary to the architect's idea of architectural beauty. It would be easy to illustrate this assertion, by giving the names of distinguished architects, alive and dead, and of buildings lying within the metropolitan boundaries. The railway stations of London are, for the most part, as inconvenient as the most perverse ingenuity

could contrive. Hotels are planned without any hotel-keepers being consulted, and are, consequently, wanting in the most essential arrangements for carrying on that business. How seldom do we find a well-arranged stable and set of coach-houses attached to a nobleman's mansion! The stables of Buckingham Palace have almost every possible fault. As for private houses, at from £80 to £200 a year, it would seem as if architects never remembered that there were at least two climates in England —a winter and a summer. But, when Mr. Cole professed to defend Captain Fowke's selection, on the ground that Bramante, Michael Angelo, Christopher Wren, and other men of genius, had not been regularly educated as architects, he conveniently forgot that those illustrious artists worked their way up to fame and confidence by slow degrees, and did not make their first architectural appearance on designing a building to cost a quarter of a million of money. The selection may have been a happy hit, but that remains to be proved. There is a very wide margin between open competition and the selection of an unknown, untried man.

The possibility of our supply of corn from America being interrupted, either by war or the continuance of the present internal contest, makes a calculation of our possible European supplies a matter of great interest. A writer in the *Revue des Deux Mondes* has treated this question in a paper entitled "Hungary, and the food supplies of Europe." He expects that the emancipation of serfs in Russia will seriously diminish the supplies from that country. He shows that, wherever the *corvée*—or system of forced labour in return for use of land—has been abolished, the first effect has been to throw land out of cultivation. But he sees a compensation in Hungary, where the landed proprietors have established a system of cultivation by paid labourers, in lieu of the feudal system they abolished in 1848, and where a great network of railroads and river navigation is about to come into operation. In 1862, three lines of cheap conveyance, intersecting Hungary and ending in Trieste, will be opened. These routes include about 2100 miles of steam navigation, fed by about 350 miles of rivers or canals, traversed by common barges or boats; and 1400 miles of railways, not including the Vienna and Trieste lines. To load the railway trucks and steamboats, Hungary has 25 million acres of arable land, nearly 4 million acres of meadows, 1 million acres of vineyards, besides forest, moor, and mountain land; in all, upwards of 60 million acres of land, more or less agricultural in its character. The soil is fertile, the climate favourable to corn crops, the landlords intelligent, and well acquainted with the best English labour-saving machinery. Nothing but peace and liberty are needed to make it the granary of Europe, as well as a rich source of revenue to Austria, if her Emperor will consent to exchange free institutions for a reasonable tax on produce and exports.

## Circular to Gas Companies.

The City of London gas question has assumed an entirely new phase. It has hitherto been taken for granted that the Great Central Gas Company was legally authorized by the Metropolis Gas Act, 1860, to raise the price from 4s. to 4s. 6d. That opinion was confirmed by legal authorities, and the outcry against the company was founded, not on a violation of the law, but on an alleged breach of faith, as the company's Act was obtained on the condition that they should at all times supply gas at 4s. per 1000 feet. The City gas agitators, having tried in vain the effect of moral force to induce the company to relent, thought the only resource left to them was to apply to Parliament to exclude the City from the operation of the Metropolis Gas Act. In that condition matters remained for some time, until doubts were again raised of the legality of the advance of price by the Great Central, and Mr. C. Pearson, who was the main instrument by which that company was formed, was instructed, in conjunction with the City Remembrancer, to draw up a new case on the subject, to be submitted for counsels opinion. The case as prepared was submitted to the same three counsel as before—viz., to Mr. Russell Gurney, the Recorder; to Mr. Bovill and Mr. Gibbon; and, whether the result is to be attributed to the dexterity with which the case was drawn up against his own offspring by the father of the company, or to mental vacillation, or to the hallucination which seems to perplex all attempts to elucidate metropolis gas legislation, so it is—two of the legal gentlemen, who before expressed the opinion that the provisions of the Metropolis Gas Act override the Great Central Gas Act, have come round to the conclusion that, in order to enable the Great Central Gas Company to demand or receive more than 4s. per 1000 feet, the 24th section of their Act must have been repealed. They proceed further to state that that section has not been repealed, either directly or by implication, and that the company are, therefore, restrained from charging more than 4s. Mr. Gibbon, however, retains his former opinion, and the reasons he assigns for it are so clear and comprehensive, and so strictly in accordance with the justice of the case, that we imagine they will meet with general concurrence, whatever may ultimately be determined to be the legal bearing of the Act. Mr. Gibbon contends, that the provisions as to the price and quality of the gas in the Great Central Company's Act were so closely associated that they cannot be considered apart. The company were by their Act compelled to supply gas of the illuminating quality of 9½ sperm candles for 4s. per 1000 feet; but, by the Metropolis Gas Act, gas of that quality is prohibited from being supplied; therefore, Mr. Gibbon contends, the clause of the Great Central Company's Act which limits the price has become inoperative, by having nothing to operate upon—the subject to which it relates having been abolished by the Act of 1860.

This seems to be a fair construction of the meaning of the Act, for the Legislature could never have intended that the Great Central Company should be compelled to supply gas of a greatly improved quality for the same price as gas of the low illuminating power which their Act provided. The changed opinions of the two senior counsel have, however, placed the Great Central Company in an awkward predicament, and they have accordingly given notice to introduce a bill into Parliament "to remove doubts as to the powers of the company under the Metropolis Gas Act," to raise and regulate the price of gas notwithstanding the provisions of their Act of 1851, and to repeal or amend all such provisions of that Act as may contravene those of the Metropolis Gas Act. Though the company may not have complied with the standing orders in point of time, it is anticipated that the difficulty may be overcome. In that case, the Legislature will have to consider whether they will exclude the City of London from the operation of the Act of 1860, or solve the doubt in the manner suggested by the notice of the Great Central Company.

There have been several meetings of the Commissioners of Sewers, and of the Court of Common Council, in which the gas supply of the City has been made the subject of debate, and in which Dr. Abraham and Alderman Dakin have been the principal disputants. At the Court of Common Council on Thursday, Dr. Abraham sought to expel his antagonist from taking part in further discussions of the subject, by applying to him a standing order, to the effect that no person who is a member of the court should be a contractor, or be in any way employed on the business of the court. The Common Serjeant observed, that it was the almost invariable practice in modern legislation, to exclude shareholders in joint-stock undertakings from the operation of such a prohibitory clause, and that the public inconvenience would be enormous unless this were the case. In opposition to this opinion, however, Dr. Abraham's motion was carried; but, we believe it is extremely doubtful whether the resolution to exclude the directors of gas companies from the Commission of Sewers will meet the sanction of the law authorities. In the mean time, Mr. Dakin has issued a pamphlet, addressed to the gas consumers of the City of London, for the purpose of defending himself, and the Great Central Company, from the charges which have been made against them, of want of fidelity to the engagements entered into with the gas consumers of the City, when the company was formed. This pamphlet is a clear and concise recapitulation of the statements made by Mr. Dakin personally, on several occasions in the Court of Common Council and at the meetings of the Commissioners of Sewers, when the charges of breach of faith were made against him. It contains, within a few pages, a triumphant refutation of those charges, and shows that a large body of the gas consumers of the City, on the expectation of whose support the company was formed, deserted them at their utmost need, and nearly wrecked their hopes of a successful issue.

There has been no further action on the part of the meter-makers, to urge the Metropolitan Board of Works and their inspectors to increased exertion. The manufacturers who took part in the recent proceedings are advised that actions may be maintained against the Board for all losses and damages caused

by the failure of the Board to take the necessary measures to put the Act of 1859 in operation within the time prescribed by the Act of last session; and, as these damages are daily increasing, the manufacturers wisely prefer waiting until the amount can be ascertained, before they take further proceedings. The Board may, by putting their shoulders zealously to the wheel, and completing their apparatus, be able to diminish the claim that is now accumulating against them.

A nice little piece of jobbery, and of circumlocution frivolity has just come to light, in a professed attempt to assist the inspectors in recording the registrations of the meters brought to them to be tested. Mr. George Glover and Mr. Marriott are endeavouring to involve the inspectors in the meshes of red tape, for no other purposes, that we can perceive, than to complicate the working of the Sale of Gas Act, to keep their names before the public, and to do a little private business for themselves. Specimens of certain tabular forms, drawn by George Glover, Esq., and "settled" by T. L. Marriott, Esq., have been sent to the newly-appointed inspectors, having printed in conspicuous characters "this form is copyright." These forms contain about fifty columns, in which it is proposed to record all the incidents of testing, which, in Mr. Glover's scientific mind, seem desirable to be noted. It does not require a medical gentleman and a parliamentary agent to draw up and arrange such a form as is required by the inspectors. All that is necessary, for practical purposes, is to record the maker's name, the number and capacity of the meter, whether it be wet or dry, the per centage of error, the leakage, if any, whether the meter be stamped or rejected, and the amount of fees received. Such multifarious columns as are contained in the specimen forms circulated by Mr. Glover are only calculated to produce confusion and error. We must not omit to state that the prices of these copyright publications are duly set forth, and that they are such as would secure to the author profitable returns for his labours. We have really no words to express our sense of the monstrous absurdity of attempting to give additional value to these worthless forms, by the announcement that they have been "settled" by a parliamentary law agent, who cannot practically know anything about the matter.

The many different Protean forms which the gas agitation in the metropolis has assumed, renders it extremely difficult to combat the varying and opposite shapes in which it presents itself. It will be remembered that the great grievance originally complained of was, the suppression of competition by the districting arrangements of the gas companies, which it was the first object of the agitation to prevent. The opposition to the gas companies has since undergone great changes, and two articles have actually appeared in the City organ of the agitators setting forth the advantages that would attend the concentration of the interests of all the metropolitan gas companies under one management. The *City Press* has arrived at this conclusion in consequence of the publication of the report of the Paris Gas Company for 1860. By strangely distorting and misconceiving the terms of that report, it makes it appear that the gas consumers of Paris, notwithstanding the higher price of coal, and heavy municipal charges, are more favourably situated than those of London. This unexpected advocacy from such a quarter of the advantages of amalgamated interests certainly takes us by surprise. We have, on more than one occasion, advocated that principle, and, so far, we are in accord with our contemporary. We agree with him also in admiration of the able manner in which the Paris Gas Company's affairs are conducted; but, in his anxiety to contrast the favourable condition of the gas consumers of Paris with those of London, he has made misrepresentations which completely vitiate his arguments, so far as they relate to the gas supply of the metropolis. By assuming, for instance, in his first article, the private and public consumption of gas in Paris to be equal, he arrives at the conclusion that the average price received by the company is only 5s. 1d. per 1000 feet. By deducting the octroi or municipal tax of 5½d. per 1000 feet, the net produce is reduced to 4s. 7½d. Our misleading contemporary makes further deduction for rental and other charges, which, he affirms, reduce the net price in Paris to 4s. per 1000 feet, and at that price the company are expected to divide 10 per cent., and some day to have a surplus to divide between themselves and the municipality. The inference drawn from these assumed facts is, that, as the price of coal in Paris is considerably dearer than in London, if 4s. per 1000 feet would pay 10 per cent. in Paris, gas can be sold in London at 4s., "and pay a thumping dividend on the transaction." The error which overthrows all our contemporary's calculations consists in assuming that the private and public consumption of gas in Paris are equal. The actual rental of the company in 1860 was—from private consumers, at 6s. 8d. per 1000 feet, £639,179. 6s.; and, from the public lights at 3s. 4d., £39,295. 6s. 6d.; so that the average price charged by the company was 6s. $3\frac{62}{100}$d., instead of 5s. 1d. per 1000 feet, as the writer of the article supposes. He makes several other blunders, in one of which he estimates the sum of 200,000 francs to amount to £40,000, instead of being only £8000. The fact is, that the total municipal taxes on the gas consumed in Paris amount to £51,178. 17s. 7d., consisting of—

| | | | |
|---|---|---|---|
| A duty of 2 centimes per cubic mètre of gas, or about 5½d. per 1000 cubic feet . . . . . | £43,178 | 17 | 7 |
| Rent payable for the use of the sub-soil | 8,000 | 0 | 0 |
| | £51,178 | 17 | 7 |

Those sums constitute the whole of the municipal taxes paid by the Paris Gas Company, and they are about equivalent to the parochial, county, and borough rates, to which, under the heads of poor-rates, police, lighting, paving, county, church, consolidated, and other rates, the London gas companies are so heavily taxed. It is, indeed, questionable whether the taxes paid by a London gas company are not heavier in proportion than the taxes imposed in Paris in 1860, on an undertaking which in that year yielded a profit of £371,143. 8s. 7d. Such a company would be assessed in London at £250,000 per annum; and the taxes on the Paris Gas Company amount to little more than 4s. in the pound on such an assessment.

Coal costs the Paris Gas Company a fraction of a franc above 20s. per ton, and the products return 10s., leaving 10s. as the net cost for coals for 8754 feet of gas. The net cost of coal in London is about 8s. for 9200 feet; the difference between the cost of coal in Paris and in London being about 3¼d. per 1000 feet of gas in favour of London. If we look at the condition of the gas supply in the two cities by the light these figures throw upon it, it will be seen that the Paris contract, instead of justifying, as our contemporary assumes, a price of 4s. per 1000 feet in London, it would rather warrant an average price of 6s. per 1000 feet.

Mr. Flintoff's career in Scotland seems to be approaching its close. Notwithstanding the many vaunted advantages to be gained from listening to his lectures and following his advice, we perceive that he is advertising in the Edinburgh papers for an audience. "For a short time," we are informed, Mr. Flintoff, of London, "may be engaged to lecture on gas abuses, or to erect new gas-works of the best kind, for half the sum expended by existing companies." We have long since expressed the opinion, that the Scotch people who have money in their pockets are too "cannie" to part with it to Mr. Flintoff; and we do not expect that they will avail themselves of the short time during which he is still open to engagements, to place much of their cash at his disposal.

A curious case connected with the use of mercurial pressure-gauges came before the magistrates of Cork last week. It was stated by Mr. Denny Lane, the secretary of the Cork Consumers Company, that the manufacturers of some of these instruments in London were using great exertions to force them on the market, offering as much as 75 and even 80 per cent. commission to agents. The company discovered that by the use, or abuse of one of these instruments, the soldering of the drum of a meter was injured by the mercury, and the gas escaped unregistered. This was the only case that had been clearly established, but it was contended that, in all cases, the mercury was liable to be spilled, and by corroding the pipes or meters to cause an escape of gas. It remains yet to be seen what the magistrates will do in the matter.

A prospectus has been recently extensively circulated relative to a process for producing what is called "Hydro Carbonic Gas" from tar, resin, and other bituminous substances, and water or steam. Under the head of "Register of New Patents" in our present issue, will be found an abstract of the specification of this patent, with an accompanying wood-cut, illustrating the form of apparatus proposed to be employed; and, in reply to numerous applications addressed to us on the subject, we would advise our readers to await the issue of the trial of the apparatus, which, we are informed, is about to be made in this country, before themselves incurring any expense in what appears to us, after the experience gained by the failure

of the Hydro Carbon Gas Company, to be a hopeless experiment. The apparatus patented by Messrs. Laming and Evans, on April 23, 1850, for the manufacture of gas from similar substances, had greater chance of success than the one just patented, but the cost of the hydrogen obtained by the decomposition of water, has, hitherto, stood in the way of the success of all such systems of gas manufacture.

## Correspondence.

### NAPHTHALINE IN GAS-MAINS.

SIR,—Having read Mr. George Anderson's letter in the last number of the JOURNAL concerning the use of steam with the addition of common naphtha for dissolving naphthaline in gas-mains, we wish to say that we have manufactured portable steam-boilers on wheels expressly adapted for that purpose, as well as the other requirements of a gas-work, for the past eight years, the engineers of which all agree with Mr. Anderson as to their great value for this and numerous other purposes in gas-works.

After reading the letter, we sent to Mr. Anderson a drawing of our boiler, and he immediately wrote to us, expressing his approval as follows:—"It seems a very good thing, and, if I had known of it, I would have bought it rather than take the trouble to design one. I consider that no gas company of any magnitude—that is, where a continuous supply of gas is needed—should be without such a machine. Indeed, I know that scarcely ever a winter passes but companies incur more than the expense of such an instrument through stoppages, temporary connexions, fires to thaw pipes, gasholders, condensers, &c., to say nothing of the accidents that sometimes occur through the use of fires. *Vide* the destruction of four gasholders at Dublin (United General) two winters ago."

We can only say that every line of this statement will be endorsed by every engineer who has used these steam-boilers, and we are supplying the principal metropolitan gas companies with them.

Allow us to add that we keep them in stock, and gas companies *can be at once supplied with them.*

C. & W. WALKER.

*Little Sutton Street, London, E.C.,*
*Dec.* 10, 1861.

### CIRCUMLOCUTION IN THE METER INSPECTOR'S OFFICE.

SIR,—Feeling assured that you will be willing to afford any practical information required by the newly-appointed inspectors of gas-meters, I take the liberty of forwarding to you the accompanying sheets, and to ask you whether it will become the duty of inspectors to undergo a course of instruction or apprenticeship to the party from whom the same emanated, and who kindly and most *disinterestedly* proposes to supply the kingdom with ledgers, &c.? Now, as a practical and experienced engineer, I ask you whether the inspectors and magistrates are to be made subservient to the interest of any one man, by the adoption of such an unheard of and unnecessary complication of ideas? or whether common sense and experience would not point out a much more simple and comprehensive system of doing the duties assigned to him, than by following the dictation of a "medical gentleman?" for although, however much they may respect the party as a gentleman, they did not, on accepting their posts as inspectors, enter into arrangements to become the schoolboys of any one, nor be drilled into their duties through such a "Bradshaw"-like system. If, however, they are to be *compelled* to work on such a course, will you kindly throw some light on this network of absurdity, by publishing a guide or key to the system, and also an explanation to magistrates and the public at large, so that all parties may, at least, have some slight glimmering of what it is about?

*November* 30, 1861. METER.

*Tabular Forms, drawn by George Glover, Esq., and settled by T. L. Marriott, Esq., 22, Parliament Street, London.*

*District No.* STORE-ROOM BOOK.

Progressive No.
Date
From whom
Reading of index — } METERS RECEIVED.
NAME
No. of identity
Nos. of capacity—Gas passed { Per revolution / Per hour } — MAKER'S MARKS ON METER.
Wet or dry
Store-room mark

*District No.* TESTING-ROOM BOOK.

Progressive No.
Store-room mark
NAME
No. of identity
Nos. of capacity—Gas passed { Per revolution / Per hour } — MAKER'S MARKS.
Rate per hour of consumption at burner { For leakage, the pressure being 3 inches.
Result
Temperature—
Beginning
End
Mean — Inlet of meter. Pressure being 0·5 in.
Pressure*
Temperature—
Beginning
End
Mean — Outlet of meter. For error.
Correction for temperature
Quantity of gas { Passed by holder / Indicated by meter
Rate of error
Reading of index after testing
REMARKS — TESTING.

*District No.* REGISTER.

Register No.
Date
From whom
Reading of index — METER RECEIVED.
NAME
No. of identity
Nos. of capacity—Gas passed { Per revolution / Per hour } — MAKER'S MARKS ON METERS.
Wet or dry
Fees
Date
Rate per hour of consumption at burner { For leakage, the pressure being 3 inches.
Result
Inlet—Mean temperature, the pressure being 0·5 inch
Outlet { Mean temperature / Pressure
Correction for temperature — For error.
Quantity of gas { Passed by holder / Indicated by meter
Rate of error
Reading of index of meter when stamped.
REMARKS — TESTING.

## Register of New Patents.

1217.—WILLIAM CLARK, of 53, Chancery Lane, Middlesex, engineer, and patent agent, for "*The treatment of ammoniacal waters, resulting from putrified urines, and from products extracted by the distillation of coal.*" A communication from Louis Joseph Frederic Margueritte, chemist; and Alfred Lalonël de Sourdeval, both of Paris. Patent dated May 3, 1861.

The only treatment to which waste waters have been subject to the present time, consists in extracting, by distillation, the carbonate of ammonia contained therein, collecting it in different acids, afterwards evaporating this solution, and obtaining ammoniacal salts by crystallization. It is found, however, first, that ammoniacal salts may be treated in a more simple manner, and with greater economy and rapidity; second, that carbonate of ammonia may serve, without loss of quality, for the manufacture of certain carbonates, the use of which would be of great importance; and third, that the reaction of the carbonate of ammonia, on sulphates of barium and calcium will produce considerable quantities of sulphur.

The following is a description of the different operations abovementioned—

*Preparation of Ammoniacal Salts.*—To the waste waters is added lime, in sufficient quantity to remove the carbonic acid and sulphuretted hydrogen, and so to completely free the ammonia. This liquor is suitably agitated, and mixed with milk of lime, when it is left to rest; the carbonate of lime and the sulphuret of calcium which form are deposited, and the perfectly clear liquid resulting is introduced into a spirit rectifier. This operation is performed in the same manner as in treating alcohol. When the rectifying column contains a sufficient number of plates, the ammonia disengages itself in a dry gaseous state, which is collected by means of concentrated hydrochloric or sulphuric acid. Under these conditions, and after a complete cooling of the liquid, the greater part of the ammoniacal salt formed is deposited in a crystalline state; the whole is submitted to the action of a turbine, which separates the crystals from the mother water, so that the salt may be free from iron, care being taken that the liquor is slightly acidulated and washed while the turbine is in motion, with a small quantity of water. By this method of acting

* Qy. atmospheric.

on the ammonia, instead of on the carbonate, the distillation is much easier effected, and the alkali, by reason of its extreme volatility, escapes from the apparatus in a state of gas, and leaves the waste waters which are run completely purged of the ammonia.

By saturating concentrated acids with dry ammoniacal gas, ammoniacal salts are obtained by precipitation, and all evaporation and crystallization are prevented. The mother waters from the turbine, instead of being evaporated, may be absorbed in various matters, such as sawdust, plaister, chalk, earth, or animal black, and sold at a renumerative price as manure, while the azote may be sold at 9d. per pound and upwards. By this mode of operating, not only is the evaporation avoided, but also the destruction of the apparatus.

*The Preservation of Insoluble Carbonates.*—It is well known that in the manufacture of insoluble alkaline earth, or metallic carbonates, such as carbonates of baryta, zinc, lead or copper, an alkaline carbonate is employed, that of soda generally. The high price of this product has, hitherto, prevented its employment in the preparation of different carbonates of which the production is necessitated, both in the arts and industry.

The carbonate of ammonia in the waste waters will be found to answer advantageously as a substitute for the carbonate of soda, as in every case in ceding its carbonic acid to a mineral acid the ammonia augments in value, which is not the case with soda under the same circumstances, for carbonate of soda, which becomes chloride or sulphate, loses nearly its whole value, while carbonate of ammonia, obtained from waste waters, possesses the advantage of being easily extracted, and will be rendered of great commercial value. All metallic carbonates—especially those of lead, zinc, and copper—may be prepared by precipitating their corresponding chlorides or sulphates with ammoniacal carbonates from waste water. The mother water, containing the ammoniacal salt, may be evaporated or treated by a base which cedes the ammonia, and can be liberated, to be treated in the rectifying apparatus above-mentioned. As the carbonate of ammonia always contains a certain quantity of hydrosulphate of ammonia, the solution should be previously filtered in a metallic oxide, to fix the sulphuretted hydrogen, which colours or renders the carbonate impure. Besides the metallic carbonate, there is also an alkaline earthy carbonate, of which the preparation is very simple and economical—viz., carbonate of baryta. Sulphuret of barium is prepared by calcining, in a reverberating furnace, a mixture of sulphate of baryta and charcoal. The mass is washed, and emptied into the waters charged with carbonate of ammonia. This carbonate of ammonia will be precipitated perfectly white and pure, and it is then washed and dried. The mother water from the sulphydrate of ammonia is treated with lime containing sulphuretted hydrogen, and then introduced into the rectifying apparatus. By this mode of operation, the ammonia cedes the carbonic acid which forms carbonate of baryta, and the lime employed in the ordinary way to free the ammonia serves for retaining the sulphuretted hydrogen, instead of carbonic acid. Thus, a very useful intermediate function is performed by the carbonate of ammonia, and hence the manufacture of carbonate of baryta is confined to the reduction of sulphate by charcoal.

*Preparation of Sulphur.*—In the preceding operation, it is seen that the carbonate of ammonia is transformed into sulphydrate. In this combination the sulphur can be extracted with little expense. It suffices for that purpose to filter a solution of sulphydrate on a hydrated peroxide of iron; the ammonia liberated is distilled in a rectifying apparatus, and the sulphur of iron formed is exposed to the air, whereby it is transformed into peroxide of iron. In thus depositing the sulphur, it is regenerated, and may be used again and again an indefinite number of times. It can also be operated upon in the following manner:—

The sulphurous liquid, being heated in a rectifying apparatus, disengages easily all the sulphydrate of ammonia which it contained by reason of the great volatility of the composition. It is passed thence, in a state of gas, into purifiers, filled with hydrated peroxide of iron, which absorbs the sulphur. The sulphuret of iron, being regenerated by its exposure to the air, can be employed a great number of times. When the quantity of sulphur precipitated on the peroxide of iron becomes so considerable as to sensibly diminish the action of this latter, the mixture is to be submitted to a gentle calcination in a retort, and the sulphur obtained by distillation.

The reaction of sulphuret of barium on the carbonate of baryta, which by reason of its whiteness, purity, and minute subdivision is capable of being employed in painting, and for several other purposes, particularly in the manufacture of glass, is thus effected:—First, the crude water may be distilled, and the carbonate of ammonia obtained by collecting the volatilized products, which are then precipitated by the sulphuret of barium. By these means, carbonate of baryta is obtained perfectly white and pure. Second, large quantities of mother waters, the residue of the distillation of carbonate of ammonia, with sulphuret of barium, and a mixed precipitate, are obtained by phosphate, sulphate, carbonate, &c., of baryta, which can be used with advantage in every case for the natural pulverized sulphate of baryta. Instead of sulphuret of barium, sulphate of lime may be employed, and from this is obtained phosphate of lime sufficiently pure to be sold for agricultural purposes. Third, directly after the clarification of refuse waters by sulphuret of barium, they are heated, when there results a precipitate mixed with phosphate, carbonate, sulphate, &c., of baryta—a white precipitate—which can be beneficially employed for painting, thickening of paper, and the preparation of cyanides of barium by ammonia, or by azote of the air; and fourthly and lastly, the crude refuse waters are filtered on beds of sulphate of lime, which retain, in their transition to the state of insoluble phosphate of lime, phosphoric acid, so precious for agricultural purposes, and which reacts on the carbonate of ammonia, to form a carbonate of lime and sulphate of ammonia.

The waters running from the sulphate of lime filters are mixed with a solution of sulphuret of barium, whereby the sulphate of ammonia which they contain produces a precipitate of sulphate of baryta, tolerably pure. It should be remarked that in all operations above described, and which permit of utilizing carbonic acid and sulphuric acid, the waste or refuse waters have lost nothing of their value as regards the ammonia they contain, and that it is easy to recover this alkali by known means, and by the means above described.

The following is a very easy method of extracting ammonia contained in waste or refuse waters, after a previous addition of lime to liberate the ammonia. The water is distilled in an apparatus such as is employed to rectify alcohol; but, from experiments made on a certain scale, the patentee has been led to introduce in the construction and arrangement of this apparatus some important modifications. This operation, which otherwise works perfectly well, necessitates the employment of lime, which entails expense and considerable labour. It has been tried whether it is possible to distil directly the refuse waters after previously adding lime—*i. e.* by volatilizing the carbonate of ammonia, in order to obtain it in a state of gas; but, it is found to be impossible, as the carbonate of ammonia is a solid salt, and has not, so to speak, the tension of 100°. Another plan was to distil and obtain it as alcohol, mixed with water, but, in a state of great concentration. After having overcome some difficulties, by means of different changes in the apparatus, the patentee has been enabled to obtain carbonate of ammonia in solution, excessively concentrated. It is this solution which, treated by sulphuric acid, and evaporated, produces the sulphate of ammonia, at very little cost. The two distillations of ammoniacal gas and carbonate are rendered continuous, which is considered a very important point.

Besides employing the rectifying apparatus to extract from refuse waters the ammonia in a state of dry gas, and of carbonate of ammonia in a state of concentrated solution, the preparation of ammonia is further effected by the following process. Ten or twelve receivers of cast or sheet iron, communicating with each other, so as to resemble an apparatus known as Woulf's apparatus, are filled with refuse water. At one extremity a current of steam enters, which raises the contents to the temperature of ebullition. At the other extremity are introduced the refuse waters in a continuous and regular manner, which naturally flow in an inverse direction to the current of steam. From the first receptacle, where the steam enters, the carbonate of ammonia is driven into the second receiver, and thence into the third, and so on, in such a way that the water is completely purged of this salt near the entrance of the steam; and, on the contrary, it becomes enriched towards the point where the refuse waters enter, by which arrangement the running of waste water from the first receptacle may be permitted, and the continuity of the operation maintained as in distilling alcohol. In a word, by the diffusion of the steam in a current of refuse waters, the extraction of the carbonate of ammonia mixed with steam, is effected, an operation (analogous, but differing so far that it is intermittent) generally used, in which the carbonate of ammonia is extracted, under the influence of a current of steam passing in two apparatus of large dimensions. It is ascertained that it is preferable to have apparatus presenting to a current of steam but little height of liquid to traverse—from 20 to 40 inches, at most; for, on the one hand, the carbonate of ammonia disengages itself more easily, and, on the other hand, the quantity of steam withdrawn is very much less. Instead of condensing the carbonate and steam, they are conducted directly to the heated sulphuric acid in a leaden vessel, which forms the last receptacle in Woulf's apparatus. The carbonate of ammonia is alone absorbed by the acid; and the steam, continuing its course, passes into a worm-tube, which heats the refuse waters for treatment in the apparatus. In this way, the condensation, reheating, and redistillation of the water which accompanies the carbonate are obviated. To prevent condensation of the water in the sulphuric acid, it suffices to maintain the latter at a temperature nearly up to a boiling point, which, for acid in the leaden vessels, should not exceed 330° Fahr. It is easy to produce this temperature, by means of a circulation of steam at a pressure of about four atmospheres. As the sulphuric acid may boil and concentrate in the leaden chambers, it suffices to cover with this metal the worm-tubes intended to heat the acid; but it is as well to remark that, in proportion as the acid becomes saturated, the point of ebullition lowers—*i. e.*, by employing diluted sulphuric acid, it would suffice to keep at some degrees below 212° Fahr., to prevent any condensation of steam.

When the sulphuric acid is saturated, it is run off in solution by means of a cock, which solution, when cooled, forms a mass, and constitutes sulphate of ammonia, which only requires to be slightly desiccated. By the different arrangements above described, great economy is effected in the amount of fuel required, the operation being simple, rapid, and continuous in its action. Thus to distil waste waters, and manufacture sulphate of ammonia, the Woulf apparatus is employed, traversed by a current of steam, the products of distillation of which pass directly and immediately into the sulphuric acid to a temperature sufficient to prevent condensation of, or combination with, the steam.

Taking as a basis the fact that, at an ordinary temperature, an ammoniacal solution, placed in a closed vessel, with an acid solution, gives up to the latter the whole of its ammonia in a very short time, the patentee has devised a new method of treating refuse waters, which is as follows:—A closed boiler, separated by a vertical partition into two compartments, is employed. Into one of the compartments is placed the liquid ammonia, with the addition of lime; and, in the other, which is lined with lead, is placed diluted sulphuric acid. This operation may be effected at the ordinary temperature, or it may be heated to 140° or 212° at a pressure of one atmosphere. The ammonia is absorbed by the sulphuric acid more or less rapidly, according to the temperature, and also with more or less expense with relation thereto. When the absorption has terminated, which may be ascertained by drawing off and trying a small quantity of ammoniacal liquid, it is allowed to run off, and is replaced by a fresh quantity of liquid. The same takes place when the acid is saturated—it is renewed, and another operation commenced. In this manner, the ammoniacal and acidulated liquid being at the same temperature, there is no reason why there should be more steam in one than the other, as the ammonia alone has a tendency to escape from the liquid containing it, and be absorbed by the sulphuric acid. Thus will be obtained, on the part of the acidulated liquid, a strongly concentrated solution of sulphate of ammonia, which costs little for evaporation. In this case, there will be no production, passage, condensation, nor reproduction of steam, and the economy in fuel will be very considerable.

One of the principal conditions to be observed is, that in the boiler the ammoniacal surfaces of emission and the acidulated surfaces of absorption should be as extended as possible. It will thus be found that the expense

of the operation is very small. This may be readily ascertained beforehand, as it is known to a nicety what is the quantity of coal necessary for raising a given quantity of water to 140° or 212° Fahr., at a pressure of one atmosphere. The expense of fuel is *nil*, when working at the ordinary temperature of the atmosphere, but the operation will be much slower.

The greater part of the sulphate of ammonia which is manufactured either from water produced in the distillation of coal, or from refuse waters, is employed in the manufacture of alum. The high price of this sulphate has, hitherto, been the obstacle to its application to agriculture, which objection still applies to it, in consequence of the cost of the necessary sulphuric acid employed, which amounts to 10s. for every 2 cwt. of sulphate. It is proposed by the present patentee to supply agriculturists with azote in the form of ammonia, that is, in an assimilated state. The nature of the acid combined with the ammonia is of no consequence, as the base alone acts on vegetation, and there is little doubt the sulphate of ammonia produces certain results in the ground which ammonia has failed to effect. From observations of the prodigious development of vegetables in an atmosphere of ammoniacal gas, it is argued as a consequence, that the acid which retains this alkali with the least tenacity forms a salt, the most favourable for vegetation. Hence the patentee employs for this purpose carbonic acid, and for a salt, uses bicarbonate of ammonia. It is proved by experiment that the alkaline reaction of the earth and the atmosphere is an indispensable condition for the development of any vegetation exposed to its action, and that the vegetable albumen composing the greater part of the sap is coagulated the same as animal albumen by means of acids, other than carbonic acid, and that, consequently, neither the vegetable nor the animal can exist, or be developed in an acid state, although acidulated juices may be met with in certain fruits, or through parts of plants.

The employment of lime, dessicated night soil, guano and dung, proves that vegetation has always a permanent alkaline base (such as lime and ammonia); it also possesses carbonic acid which the plants decompose and assimilate in some measure, and this is the only acid (up to the present time, at least) the harmlessness of the action of which is properly understood. Two equivalents for the carbonic acid will be found in bicarbonate of ammonia. This salt supplies to the plants both azote and carbonic acid, which are so essential before development, and fulfils all the conditions above mentioned. It also easily abandons ammonia, and leaves it free, and is further easily assimilated to plants. Ammonia produced by the decomposition or fermentation of stable manure, is disengaged in the form of carbonate or bicarbonate of ammonia, and this salt forms of itself a very active manure, as is incontestably proved by careful experiments.

The following is the method of preparing this salt:—The ammonia is first extracted from the stagnant or refuse water of gas-works, &c., and is then saturated with water at the ordinary temperature which constitutes a volatile alkali. A current of carbonic acid, produced by the combustion of charcoal, is then passed into the solution. The ammonia is thus saturated, and, by degrees, becomes less and less influenced by the current of carbonic acid gas (azote), and is precipitated in the form of small brilliant crystals, which are then collected. The mother water remaining is again saturated with ammoniacal gas, and then with carbonic acid, and so on, for the purpose of furnishing an indefinite quantity of bicarbonate of ammonia. For this purpose, Woulf's apparatus is employed, with a number of receivers communicating with each other, and terminated by a vessel filled with sulphuric acid, to finally retain the ammoniacal gas, which would otherwise escape from the apparatus. Crystallized bicarbonate is dried at the ordinary temperature, and may be supplied in that state to agriculturists. This salt is of a permanent character, and is only disengaged, in a gaseous state, with extreme slowness, which is a good condition for its prolonged action upon the plants. Instead of manufacturing sulphate of ammonia for agricultural purposes, sulphites of ammonia may be produced by the introduction of sulphurous acid to the ammonia, thereby saving a great expense both in material and transport.

The claims are for—

1. Obtaining ammoniacal salts without employing evaporation.
2. Preparing insoluble carbonates in the economial manner described.
3. The preparation of carbonate of baryta, by the reaction of carbonate of ammonia distilled from refuse waters on sulphuret of barium.
4. The preparation of phosphates of baryta and lime, for precipitating the waste water resulting from the distillation of carbonate of ammonia by means of sulphuret of barium, that of calcium by means of sulphate of lime, making the chloride of calcium.
5. The general and immediate precipitation of waste waters, clarified by means of sulphurets of barium and calcium for the purpose of obtaining a mixed precipitate.
6. The filtration of waste waters through layers of sulphate of lime, which fixes the phosphoric acid; and also the ulterior precipitation of the same waters by sulphuret of barium.
7. The extraction of sulphur from sulphates of baryta and lime.
8. The distillation of carbonate of ammonia, by means of a spirit rectifying apparatus, arranged as described.
9. The extraction of carbonate of ammonia from a continuous current of waste water, by means of steam passing through a Woulf's apparatus, and also passing it immediately through heated sulphuric acid.
10. Mixing the ammoniacal waters and sulphuric acid in a closed vessel, either at the ordinary temperature or at the temperature of 140° to 212° Fah., at a pressure of one atmosphere.
11. The employment of the apparatus known as a spirit rectifier, which has hitherto only been employed for distilling alcohol, for the purpose of distilling ammonia and carbonate of ammonia contained in refuse waters, putrified urine, water of condensation, and other similar products.
12. The preparation of bicarbonate of ammonia, and its application as a manure to agriculture.

1316.—Frederick Hahn Dauchell, of Red Lion Square, Middlesex, for "*Certain improved methods of, and apparatus for, ascertaining and removing impurities contained in water.*" Provisional protection only obtained. Dated May 24, 1861.

This first part of this invention consists in a method of enabling persons not acquainted with analytical chemistry, to ascertain whether any water, intended for domestic, manufacturing, agricultural, or other purposes, contains impurities in solution, and of what kind. The second part consists in a method of removing or arresting such impurities when present.

The method which is adopted for the first part of the invention consists in the use of a potash containing standard solutions of prussiate of potash, bichromate of potash, permanganate of potash, acetate of lead, baryta, caustic lime, and chloride of zinc, in such proportions that by being added to any water to be tested will effect a change in its appearance, should impurities be present.

The method which it is proposed to employ for the removal of impurities in water, is by forcing the water by means of a force-pump or force-pumps, through some purifying medium, such as animal or vegetable charcoal, or other material adapted for the purpose, in such a manner that the purified water shall be discharged direct from the filtering apparatus instead of, as has hitherto been proposed, from the pump-spout. There is also applied for the same purpose a pump, so constructed that the water is raised or raised and forced by means of alternate contraction and expansion of a tube, bulb, or other vessel, formed of india-rubber or other elastic material, or of similar tubes, bulbs, or other vessels containing a metallic or other spring, operated on by pressure.

The invention further consists in a floating filtering vessel for the purpose of going alongside ships that are building on or adjacent to the banks of rivers, lakes, canals, or ponds, and supplying pure water by forcing the impure water in which the vessel floats, or that purified through any other convenient source of supply through the filtering medium contained in the vessel by means of pumps worked by steam, water, or hand power, or by other mechanical contrivance.

1343.—Comyn Ching, of Castle Street, Long Acre, Middlesex, gas engineer, for "*Improvements in gas chandeliers.*" Provisional protection only obtained. Dated May 29, 1861.

The first part of this invention relates to the telescopic gas-chandeliers at present in use, and consists in the dispensing of the ordinary unsightly balance weights. It is proposed to place on each side of the gas-pipe suspended from the ceiling and near to it, a toothed wheel each of different diameters, and at, or near the top of the lower and outer tubing, a similar wheel, the lower wheel being beneath the upper ones. An endless chain, which bites the teeth of these wheels, is passed over the top large wheel, and falls under the bottom wheel, when it is again raised in the same direction, and passed over the second, or smaller wheel, the lower or unemployed part of the chain resting in an ornamental tray or dish, under the inverted T-piece. The chain now being in gear with all three wheels, it is evident that the weight of the chain will allow of the chandelier being raised or lowered to the required height, and there remaining, thus dispensing with the ordinary balance weights, the above-mentioned wheels being hidden from view by means of any suitable metal ornament.

The second part of the invention relates to the prevention of the escape of gas from such said telescopic-tubes. It is proposed to employ an ordinary stuffing-box, and above it a cup, forming part of the ornament before-mentioned, into which is placed a suitable non-evaporating fluid. A cup is also attached to the bottom of the upper pipe, such cup having incisions or perforations on the upper part; the end of the pipe is placed within the cup, so that should there be any fault or imperfection in the packing, instead of the gas escaping, the liquid will pass the stuffing and run down the outer surface of the inner pipe into the cup, which, when not quite full, will touch the bottom of the pipe, and instantly extinguish the gas. Thus it is impossible that at any time the gas can escape from the telescopic joint or stuffing-box.

1344.—Thomas Hale, of 21, Barnsbury Row, Park Road, Islington, Middlesex, gentleman, and Arthur Wall, of 12, Canton Street, East India Road, in the same county, gentleman, for "*Improvements in the construction and internal arrangement of furnaces, and in the preparation, manufacture, and treatment of clays, and of articles, surfaces, structures, and erections, subject to the action of fire or atmospheric influence.*" Provisional protection only obtained. Dated May 29, 1861.

This invention, so far as it relates to improvements in the construction and internal arrangement of furnaces, consists in the erecting in the furnace in contact with and near to the fire, a wall or partition, or a chamber, or two or more chambers, with openings or perforations through, or into which, the smoke, gases, or vapours, arising from the combustion of the fuel or the air before coming in contact with the fuel, are to pass; the object being to consume the smoke and its hydrocarbons in the furnace, and thereby economize fuel. They may be erected with ordinary fire-clay or fire-brick, but it is preferred to erect them with fire or other clays, or bricks prepared, manufactured, or treated in the improved manner hereinafter mentioned, which very greatly enhances their efficiency, and adds to their durability.

So far as the said invention relates to improvements in the preparation, manufacture, and treatment of clays, and of articles, surfaces, structures, and erections subject to the action of fire or atmospheric influence, it is as follows:—to clay, in the process of manufacture, is added a preparation of powdered asbestos, pumice-stone or lava, magnesia, and bone-ash, which is made as follows:—asbestos and pumice-stone, in a powdered state are placed in a furnace or crucible, and while there a quantity of muriate of soda is added to them. When sufficiently treated, the mass is taken out and reduced to powder, and then the magnesia and bone-ash are added, the latter also being first reduced to powder, after which the preparation is ready for use. Or, such preparation may be further reduced to a paste, wash, or paint, with water either pure or mixed, with, or without the addition of carbonate of potash or carbonate of soda, or both, and it is then used to coat bricks or other articles, surfaces, structures or erections, or parts thereof manufactured, erected, or built of clay (whether heated as above-mentioned or not) earthenware, stone or metal. The effect of the process is to render the materials so prepared or treated less liable to the destructive action of fire or atmospheric influence, and it is applicable not only to the erection of walls, partitions, or chambers such as above-described, but to the formation, manufacture or treatment of any articles, surfaces, structures or erections, whether of metal, brick,

ston arthenware or clay, which are exposed to fire or the influence of the osphere.

135—JOHN HENRY JOHNSON, of 47, Lincoln's Inn Fields, Middlesex, of 166, Buchanan Street, Glasgow, N.B., gentleman, for "*Improvements in apparatus for regulating the pressure of gas.*" A communication from Henry Giraud, of Paris. Patent dated May 30, 1861.

T invention relates to a peculiar construction and arrangement of g acting apparatus, for regulating the pressure of gas in mains or ice-pipes. It consists in the use of two separate apparatus working combination with each other, the one piece of apparatus being placed some central position in the locality supplied by the works, whilst the her is situated at the place where the gas is manufactured.

The first-mentioned piece of apparatus consists of a fluid or pressure-auge, or indicator, the needles of which are so constructed that one of heir branches dips into one or other of two vessels containing mercury, or establishes in any convenient manner an electric contact whenever the pressure varies in the slightest degree from its regulated or desired amount. Two conducting wires connected severally to the vessels of mercury or contact surfaces, as the case may be, extend to the gas-works, and the needle of the indicator being in communication with one of the poles of a battery, the other pole of which is in connection with the earth, it follows that each time the pressure varies, one of the branches of the needles establishes an electric communication with the gas-works.

The second piece of apparatus which is placed at the gas-works consists of an hydraulic valve or regulator placed on the mouth of the main which conducts the gas from the gasholder, such valve being opened or closed by an arrangement of wheel-work actuated by a weight and double gearing. Two electro-magnets, attached one to each wire, are so adjusted in the apparatus as to act upon the starting or reversing-lever of the wheel-work, and according as one or the other of these magnets is excited, the lever may be brought into two opposite positions, or will remain in a central position when both magnets are unexcited, while the valve will be either elevated, depressed, or held stationary, accordingly. By a slight modification of the pressure indicator, it may be transformed into a commutator, in which case, one conducting wire only, in place of two, would be required.

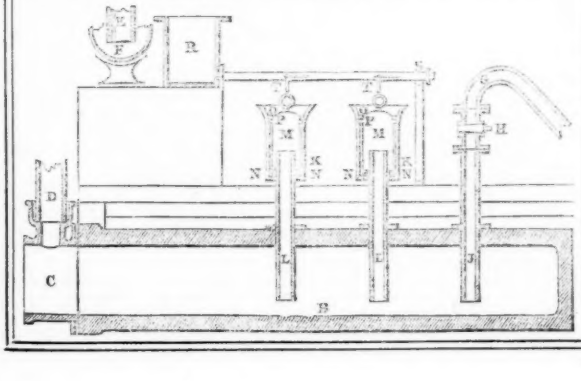
The claim is for the general construction, arrangement, and combination of self-acting apparatus for regulating the pressure of the gas, as hereinbefore described.

1397.—ALEXANDER PRINCE, of Patent Office, 4, Trafalgar Square, Charing Cross, Middlesex, for "*Improvements in the manufacture of gas, and in apparatus connected therewith.*" A communication from Messrs. Schaeffer and Walcker of Berlin. Patent dated June 4, 1861.

This invention relates to certain improvements in the manufacture of gas, and in the apparatus to be used for generating the same. These improvements are founded on the fact that steam, in the presence of carburetted hydrogen substances, conducted over glowing coals, decomposes itself, so that it produces a clear luminous gas in larger quantity and better quality than the hydrocarburetted substances would produce if alone decomposed. The steam thus decomposed with the red hot-coal forms hydrogen and carbonic or oxide gas, which, being likewise in a glowing condition, decomposes the present hydrocarburet, and combines with it. This is not done by a mere mechanical gas mixture, but by the thus-formed hydrogen, which dissolves and absorbs the great excess of coal which the hydrocarburetted substances lose at the time of decomposition, and this combination produces the above luminous gas. The preparation and apparatus for effecting these objects are simple and efficient, and consist as follows:—

The carburet of hydrogen substances which, for the sake of economy, are employed, are these—although others may be used with equally good results, yet, on account of their price, they are found objectionable:—wood, pitch, resin (American), oil of resin, coal-tar, brown coal-tar, oil of pine, and any other carburet of hydrogen substances.

The apparatus for the manufacture of this gas, consists of a furnace of suitable construction, in which is placed a retort which may be round, oval, or otherwise. Into this retort are inserted three or more pipes or tubes, having a U-shaped pipe or water-closing attached near each of their upper ends, and having a funnel at the top of each. A chest, or cistern, is placed above, and is divided into partitions, and filled partly with tar and partly with water. These partitions are supplied with taps or cocks to regulate the supply of liquids into the funnels, and through the pipes into the retort which is filled with charcoal, solid or powdered, or any other suitable substance capable of being heated to a red heat by the fire of the furnace. The material being now red hot, the liquids are allowed to fall over the top thereof. The gas generated passes through a pipe in the end of the retort into a condenser and gasometer. In order to produce 1000 cubic feet of gas with double the intensity of light that has been hitherto obtained from coal-gas, there must be applied from 30lbs. to 40lbs. of tar or other material containing hydrogen, 50lbs. to 60lbs. of water, and 4lbs. to 6lbs. of charcoal or other suitable substance which will be found sufficient for the working of some weeks, and so on in proportion to the quantity to be manufactured.




In the annexed drawing, B, is the retort, which is set in a furnace, and is supplied with an iron mouth-piece, C, which communicates through the ascending pipe, D, and the pipe, E, connected with it with the vessel, F, which serves as a tar-reservoir, and at the same time as a tar or water-closing for the pipes and retorts. The produced gas is led to the condenser and gasometer. At the side of the retort across the flue is placed an iron pipe, G, which in its lengthening is connected by the cock, H, with the pipe, J, and reaches almost to the bottom of the retort. Besides the pipe, J, two similar pipes, L, are led into the retort. The same carry above the furnace-vessels, K, through the bottoms of which the pipes are now lengthened 4 or 6 inches. Into these vessels, bell-shaped covers, M, are put, and they have, at their lower circumference, openings, N. By the projections O, P, the cover, M, is held. The projections are so arranged that, in turning the cover, they can be taken away at pleasure. In this manner, if the vessels, K, contain liquids, the pipes, L, are closed by a pressure which corresponds with the height of the pipes, L, projecting into K. The direct access into the pipes, L, for cleaning, &c., is open, notwithstanding the removal of the cover, M. Upon the wall of the furnace, so that it can be warmed at the same time, stands the reservoir, R, for the reception of the materials supplied for gas-making. These materials are conducted to the vessels, K, by the pipe, S, and the cocks, T. In making gas, a stream of tar, or other material, is continually led into the glowing retort, which is filled with coal by means of the cocks, T, the vessel, K, and the pipes, L; whilst through the cock, H, and pipe, G, steam or water enters, which is obtained and superheated by allowing the water to drop into the front end of the pipe, G. The produced gases are led through C, D, E, and F.

The claim is for the method of manufacturing gas, and the apparatus connected therewith, as herein described, or any modifications thereof, substantially the same, to all intents, as and for the purposes herein set forth.

## APPLICATIONS FOR LETTERS PATENT.

3017.—WILLIAM COOKE, of 26, Spring Gardens, St. Martin's-in-the-Fields, London, civil engineer, for "*A wind guard for curing smoky chimneys.*" Nov. 30, 1861.

3024.—GERARD RALSTON, of 21, Tokenhouse Yard, London, for "*Improvements in the mode of preparing and applying a certain material on the hulls of iron or wooden ships, or on the surfaces of materials for building the same; also for preventing oxidation and tubercles in iron water-pipes.*" A communication. Dec. 2, 1861.

3038.—CHARLES CRABTREE, of Bingley, York, paper-tube maker, for "*Improvements in paper-tubes, and in the means or machinery for making or manufacturing the same.*" Dec. 4, 1861.

3041.—WILLIAM EDWARD NEWTON, of the patent office, 66, Chancery Lane, London, civil engineer, for "*Improvements in pumps.*" A communication. Dec. 4, 1861.

3048.—JOHN KNOWELDEN, of Southwark, engineer, for "*Improvements in pumps.*" Dec. 5, 1861.

3051.—WILLIAM DICKS, of Floore, Northampton, smith, for "*Improvements in pumps.*" Dec. 5, 1861.

3052.—JAMES COCHRANE of Harburn, Midlothian, gentleman, for "*Improvements in wet gas-meters.*" Dec. 5, 1861.

3053.—JOHN BAILEY and WILLIAM HENRY BAILEY, of the Albion Works, Salford, Lancaster, turret clock-makers, for "*Improvements in apparatus for indicating the pressure of steam and gases, the amount of vacuum, the flow of fluids, the weight of materials, and the speed of bodies either revolving or traversing, and also the employment of aluminum or its alloys, in the manufacture of the same.*" Dec. 6, 1861.

3065.—HEINRICH GOTTFRIED SCHRAMM, of 149, Rothenburgsors, Hamburgh, for "*Improvements in rotatory engines and pumps.*" A communication. Dec. 6, 1861.

3066.—JOHN JAMES RUSSELL, of the Crown Tube-Works, Wednesbury, Stafford, patent tube manufacturer, and BURDETT LAMBTON BROWN, of the same place, engineer, for "*Improvements in apparatus used in the manufacture of paper tubes.*" Dec. 6, 1861.

3069.—RICHARD JOLLEY, of 47, St. John Street, Smithfield, London, for "*An improved apparatus for heating, cooling, or drying, infusing, extracting, or absorbing vapours or gases for manufacturing, medical, or domestic purposes, and for preserving liquids and solids, alimentary or otherwise.*" Dec. 7, 1861.

3070.—GEORGE THOMAS BLADON, of Grove Lane, Camberwell, Surrey, warehouseman, for "*Improvements in chimney-tops for the prevention of down-drafts in chimneys.*" Dec. 7, 1861.

3083.—RICHARD ARCHIBALD BROOMAN, of 166, Fleet Street, London, patent agent, for "*Improvements in treating atmospheric air, and other elastic fluids, for motive power purposes, and in engines and apparatuses to be employed therewith.*" A communication. Dec. 9, 1861.

3090.—HECTOR ALEXANDER, of Glasgow, Lanark, N.B., gas-burner manufacturer, for "*Improvements in turning apparatus for making gas-burners.*" Dec. 10, 1861.

3094.—VICTOR LEON DAGUZAN, of 2, Rue Sainte-Appoline, Paris, France, and of 4, South Street, Finsbury, London, for "*A system of paving.*" Dec. 10, 1861.

3108.—WILLIAM HENRY TOOTH, of Rhodeswell Road, Middlesex, engineer, and WILLIAM YATES the younger, of Parliament Street, Westminster, agent, for "*Improvements in the manufacture of iron and steel, and in the machinery, apparatus, or furnaces used therein, and for the production of gas to be employed in such manufacture.*" Dec. 11, 1861.

## GRANTS OF PROVISIONAL PROTECTION.

2714.—JOHN HAYWARD, of Everton, Lancaster, for "*Improvements in means or apparatus for raising water or other fluids.*" Oct. 29, 1861.

2815.—FRANÇOIS HENRY MARIE CÔME DAMIENS CHEVALIER FINIS DE

LACOMBE, of Paris, France, gentleman, for "*Improvements in generating hydrogen gas for illuminating, or other purposes, and in apparatus used therein.*" Nov. 9, 1861.

2827.—DAVID YOOLOW STEWART, of Glasgow, Lanark, N.B., iron-founder, for "*Improvements in the manufacture of cast-iron pipes, and in similar articles, and in apparatus to be used therein.*" Nov. 11, 1861.

2838.—WILLIAM COOKE, of 26, Spring Gardens, St. Martin's-in-the-Fields, London, civil engineer, for "*Improvements in the construction of carriages and vehicles, and in the means of ventilating the same; this part of the invention being applicable also to windows generally, and other such openings.*" Nov. 12, 1861.

2843.—JOHN HENRY JOHNSON, of 47, Lincoln's Inn Fields, London, and of 166, Buchanan Street, Glasgow, N.B., gentleman, for "*Improvements in the construction of steam, or other vapour, and water, or other liquid-tight joints.*" A communication. Nov. 12, 1861.

2851.—EDWARD CURTIS KEMP, of Avon Place, Pershore Road, Birmingham, Warwick, agent, for "*Improvements in gas-lamp glasses, and other fittings.*" Nov. 13, 1861.

2865.—HENRY ROBINSON FRICKER, of 106, Leman Street, Whitechapel, architect and surveyor, and JOHN MANLEY, of Fairmantle Street, Truro, Cornwall, civil engineer and mining agent, for "*Improvements in apparatus for facilitating the cleansing of sewers, and other water-courses or ways.*" Nov. 13, 1861.

2875.—JOHN NIXON, of Cardiff, Glamorganshire, for "*Improvements in apparatus for ventilating coal or other mines, or other underground excavations.*" Nov. 15, 1861.

2901.—LUKE SMITH, and MATTHEW SMITH, both of Heywood, Lancaster, mechanics, for "*Improvements in raising liquids, and in apparatus connected therewith, parts of which are applicable to improving the quality of fermented liquors.*" Nov. 19, 1861.

2944.—JOHN WEEMS, of Johnstone, Renfrew, N.B., tinsmith, for "*Improvements in the manufacture of metallic tubes, and in coating or plating metals.*" Nov. 23, 1861.

2949.—EUGÈNE ALEXANDRE ROUVIÈRE, aîné, of 51, Rue de Malte, Paris, France, for "*An improved pump.*" Nov. 23, 1861.

2962.—JOHN HALFORD, of Beacon Cottage, Great Barr, Stafford, for "*Improvements in collecting and utilizing smoke, gases, and such like products of combustion, rendering the same available for heating steam-boilers, and other purposes where heat is required, which improvements are also applicable to the desulphurization of coal in making coke.*" Nov. 25, 1861.

2984.—JOHN COOK, of Glasgow, Lanark, N.B., brassfounder, for "*Improvements in pendant lamps.*" Nov. 27, 1861.

2985.—AMOS WHIBLEY and THOMAS LUMLEY, both of Gloucester Grove East, Old Brompton, Middlesex, carpenters and joiners, for "*Improvements in ventilators.*" Nov. 27, 1861.

2993.—MAGNUS OHREN, of Sydenham, Kent, Associate of the Institution of Civil Engineers, for "*An improvement in the manufacture of gas and the apparatus connected therewith.*" Nov. 27, 1861.

3006.—BENJAMIN PITT, of 3A, Great Carter Lane, London, engineer, and JAMES JOHN SHEDLOCK, of 1, Wendale Villas, Earl's Court, Kensington, W., for "*Improvements in cocks or valves for the passage of fluids.*" Nov. 28, 1861.

3024.—GERARD RALSTON, of 21, Tokenhouse Yard, London, for "*Improvements in the mode of preparing and applying a certain material on the hulls of iron or wooden ships, or on the surfaces of materials for building the same, also for preventing oxidation and tubercles in iron water-pipes.*" A communication. Dec. 2, 1861.

3038.—CHARLES CRABTREE, of Bingley, York, paper tube maker, for "*Improvements in paper tubes, and in the means or machinery for making or manufacturing the same.*" Dec. 4, 1861.

## NOTICES TO PROCEED.

1841.—JOSEPH BEATTIE, of Lawn Place, South Lambeth, Surrey, engineer, for "*Improvements in arrangements in buildings and ships, with a view to the extinguishment of accidental fire therein, and also the ventilation thereof.*" July 22, 1861.

1912.—HENRY SHAW, of 40, Lower Ormond Quay, Dublin, printer, for "*Improvements in wet gas-meters.*" Aug. 1, 1861.

1927.—GEORGE FOWLER JONES, architect, York, and JAMES JONES, architectural carver, York, for "*Improvements in apparatus for protecting and arranging water-pipes and withdrawing water therefrom, and preventing injury thereto by frost.*" Aug. 3, 1861.

1939.—HERMANN CHRISTIAN MEYER, of Hoxton, London, engineer, for "*Improvements in slide valves, to regulate, or stop the flow of water, steam, or other fluid.*" Aug. 5, 1861.

2618.—FREDERICK JOHN EVANS, of the Gas-Works, Horseferry Road, Westminster, gas engineer, for "*An improved mode of, and apparatus for, carburetting gases for the purpose of illumination.*" Oct. 19, 1861.

2662.—JOHN COWPE HEATON, and JOHN DEAN, both of Rotherham, York, for "*Improvements in the construction of taps or cocks.*" Oct. 24, 1861.

2692.—CHARLES STEVENS, of 31, Charing Cross, London, patent agent, for "*Improved apparatuses for indicating escapes of lighting gas from the conveying pipes, and determining the precise leaking-places of the said pipes.*" A communication. Oct. 26, 1861.

2831.—GEORGE FERGUSSON WILSON and GEORGE PAYNE, both of Sherwood Works, Battersea, Surrey, for "*Improvements in treating fatty and oily matters.*" Dec. 11, 1861.

2843.—JOHN HENRY JOHNSON, of 47, Lincoln's Inn Fields, London, and of 166, Buchanan Street, Glasgow, N.B., gentleman, for "*Improvements in the construction of steam or other vapour, and water or other liquid-tight joints.*" A communication. Dec. 12, 1861.

# Parliamentary Intelligence

## ADDITIONAL NOTICES GIVEN FOR PRIVATE BILLS.

GREAT CENTRAL GAS CONSUMERS COMPANY. (To remove doubts as to powers of company under the Metropolis Gas Act, 1860.)

Notice is hereby given, that application is intended to be made to Parliament, in the next session, for an Act to remove doubts as to the power of the Great Central Gas Consumers Company, under the Metropolis Gas Act, 1860, to raise and regulate the price of gas, notwithstanding the provisions of the Great Central Gas Consumers Act, 1851, and to repeal or amend all such provisions of the last mentioned Act as may contravene those of the said Metropolis Gas Act.

Notice is further given, that printed copies of the Bill for effecting such object will be deposited in the Private Bill Office of the House of Commons on or before the 23rd day of December, 1861.

HALIFAX CORPORATION. Power to borrow money upon the security of the income arising from the gas-works or water-works.

# Legal Intelligence.

## COURT OF CHANCERY.

(*Before the* LORD CHANCELLOR.)

DECEMBER 10 AND 11.

### HILLS *v.* EVANS.

Mr. ROLT (with whom were Mr. GROVE, Q.C., of the common-law bar, and Mr. MARTEN) read the notice of motion, and said he asked upon that the consequental order for the wrong done, and for an account. His lordship would see that the substantial question between them was, whether there should be an injunction; and he thought he would not hear the defendant's contend that there should not be one. They would say, it must be accompanied by trial at law. He rejoiced that that was not so, for two reasons—first, that the validity of the patent and the fact of the infringement had been determined at law by proceedings binding the defendant as much as if he had been a party to them—that was to say, there was a joint-stock purse. Seven of the largest associated gas companies in England had joined to make a purse to fight the patentee; one of those companies was selected as defendant, and, as against the others, the law, if the good sense of the parties did not, stayed the proceedings. As against one, the action had been finally and effectually determined. That action they had fought at the odds of the expense to which the present defendant contributed. The plaintiff obtained a verdict and judgment, after the most solemn trial any patent ever had; and, therefore, he contended that the defendant was concluded. Secondly, that if that fact were controverted, and there was evidence upon it—although he did not think anything would throw doubt upon it—then, assuming that it did, the plaintiff said that, looking at it as a trial at law, thus solemnly discussed and decided against a third party—coupling that with the evidence of long enjoyment, and with the other legal proceedings which had been following this patentee from the time he commenced his patent to the present, when it was getting towards its conclusion—taking the whole together, the principle and practice of this court did not, as a matter of course, say this was to be tried over again against evidence, by any person who might, from time to time, choose to challenge it. That was an important question, which the plaintiff proposed, seriously, to bring before his lordship. Further, although he did not make this the head and front of his case, he was not afraid of meeting the defendant upon the question of validity and infringement upon such evidence as he should think fit to adduce. His lordship was aware that this matter had been in the paper for hearing once before, before the Lords Justices; it came on before the Lords Justices, by way of appeal from an interlocutory motion, upon which an order, in the defendant's favour, was made by Vice-Chancellor Wood. The Lords Justices, on the appeal from the interlocutory motion, said that they would hear the case originally as a motion for decree, if the parties wished it. They all did consent, and it was true that, on that occasion, the Lords Justices, or one of them, threw out what his learned friend would please to call a caution against entering into full evidence as to the validity of the patent. The defendant had not entered into evidence to impeach the plaintiff's patent, and, when the matter came before the Lords Justices upon the hearing of the cause, the defendant's counsel alleged that the caution had had weight with them, and that they had not entered into the evidence. Thereupon, their lordships said time should be given; they should go back to the Vice-Chancellor; the cause should be heard before him, and further time for giving evidence should be allowed. That was done, but they had not dared to give any further evidence.

The LORD CHANCELLOR: When was that order made?

Mr. ROLT said he would now give his lordship the proceedings in this case. Admitting that the evidence was not ripe as it stood without referring to the evidence on the trial at law, the evidence was not such as would be given by a seriously hostile defendant to the patent. It was not such as would be given by a person in earnest. He submitted that he was entitled to refer to the evidence in the action. He was not afraid to refer to it, but would say that the matter was concluded by a proceeding which, in equity, must be considered a direct proceeding against this very defendant; but, if not considered as a direct proceeding against this very defendant, yet there had been long enjoyment, repeated litigation upon one action; a most solemn trial occupying five days at *nisi prius*; seven days upon the argument of the rule *nisi*; and final verdict and judgment.

The LORD CHANCELLOR: You say the possession and the enjoyment of this patent have been with me. The result of the legal discussion at law—verdict—is with me; the evidence in support of the novelty and validity of the invention is with me, and yet you say the other side contend that there must not be upon your invention an order to take proceedings at law.

Mr. ROLT said that was the point. He contended that that serious trial at law was one which had decided the matter.

The LORD CHANCELLOR: They contributed to the defence, and, therefore, were parties in reality concerned in the action?

Mr. ROLT: Yes, my lord, the proceedings in this suit had been these:—the bill was filed in June, 1860; it was amended in February, 1861. The reason of delay would appear when he came to the contents of the bill. The plaintiff moved for an order, and obtained an order for an injunction on the 21st of February, 1861, from Vice-Chancellor Wood, without any direction to bring the question at law, although that was insisted on by the defendant. Then, there was an appeal motion from that order before the Lords Justices; that motion came on simply as an appeal from the interlocutory motion, and

the order was drawn up upon that, he believed. He had not the endorsement upon his own brief as to what took place, but he would turn to his friend's Mr. Marten's, and he had no doubt Mr. Druce would agree with it. He found it thus:—"May 6, 1861. Motion to stand over, and to come on with motion for decree; the plaintiff to be answerable in damages if court shall think fit, by reason of the issuing of the injunction after the expiration of six weeks from this time." Therefore, what the Vice-Chancellor did was this. He gave the defendant six weeks before the injunction should come into operation, to enable him to find some other process, in order to carry on his business. Accordingly, a notice of motion for decree was given, and the defendant put in his answer. The injunction was not dissolved by the Lords Justices, but, another period of six weeks was given to the defendant, and the case was to come on for original hearing before them. That was on the 6th of May; the answer was put in on the 14th of May, and it came before the Lords Justices, was argued on different days, and judgment was given on the 6th of August last. No further evidence had been given by the defendant. He made an application to his lordship that he would originally hear the case, instead of its being heard by the Vice-Chancellor: to that his lordship acceded, and it now came on for hearing. Accordingly, the learned counsel then contended that, upon the evidence, the plaintiff was entitled to a perpetual injunction, the validity of his patent having been fully established, and the defendant being party to a compromise which was made with the plaintiff for the use of his patent.

Mr. GROVE followed on the same side; and, having proposed that his lordship should look to the evidence given in the trial at law,

The LORD CHANCELLOR said he would do so, and suggested, for the consideration of both parties that, as he did not think the defendant should be precluded from having the appeal in the London Company's case heard, he would, therefore, take upon himself to decide the points of law reserved for the opinion of the Court of Error. Should he decide against the plaintiff, there would be an end of the patent; but if on the contrary, he would then hear evidence, and consider the question—whether the patent of Mr. Frederick John Evans was an infringement of Mr. Hills?

The further hearing of the case was then adjourned to the second day of next term.

# Miscellaneous News.

## METROPOLIS GAS SUPPLY.

CITY COURT OF SEWERS, GUILDHALL, TUESDAY, DECEMBER 3.

At the Meeting of the Commissioners of Sewers this day—Deputy CHRISTIE in the chair,

The REMEMBRANCER stated that the special committee, appointed to consider the question of the supply of gas to the City, had directed him and Mr. Pearson, the City solicitor, to take the opinion of counsel upon the construction of the 24th section of the Great Central Gas Company's Act, and as to how far it was altered or repealed by the 40th section of the Metropolis Gas Act, 1860? In obedience to those directions, they had submitted to Mr. Russell Gurney, the Recorder, Mr. Bovill, Q.C., and Mr. Gibbon, special pleader, for their consideration and opinion thereon—the Great Central Gas Act of 1851 and the Metropolis Gas Act of 1860, in order to ascertain whether the 24th section of the former was inconsistent with or contradictory to the 40th section of the latter; and also, whether the Great Central Gas Company were restrained by the 24th section of their Act from demanding or receiving more than 4s. per 1000 feet for the gas supplied by them in the City of London. The subject had received the very anxious and careful consideration of the learned counsel, and two consultations had been held with them thereon. Mr. Gibbon not being able to concur in the opinion expressed by the Recorder and Mr. Bovill was desired to express his own views in a separate document. To the first question, the two senior counsel replied that, they were of opinion, the 40th section of the Metropolis Gas Act, which provides that, except under certain circumstances, no company shall advance the price of gas above the rate taken by such company on the 1st of January 1860, whenever such rate is at or above 4s. 6d. per 1000 feet, is not inconsistent with or contradictory to the 24th section of the Great Central Gas Act, which provides that it shall not at any time be lawful for that company to demand or receive from any persons who shall use their gas a higher price than 4s. per 1000 feet. To the second question, they replied that, in their opinion, in order to enable the Great Central Gas Company to demand or receive more than the rate of 4s. per 1000 feet, the 24th section of their Act must have been repealed, either directly or by necessary implication. Clearly it had not been directly repealed, and they did not find anything in the language or scope of the Metropolis Gas Act to indicate an intention on the part of the legislation to regard it as repealed. The learned counsel added, "We cannot say that the question is free from doubt, as we find Mr. Gibbon, and other gentlemen, have arrived at a different conclusion in respect to it; but, after carefully considering the matter, we are of opinion that the Great Central Gas Company are restrained, by the 24th section of their Act, from demanding or receiving from any person supplied by them with gas, a higher price than 4s. per 1000 feet. Mr. Gibbon, in his opinion, states that, although the 40th section of the Metropolis Gas Act is not inconsistent with or contrary to the 24th section of the Great Central Gas Act, he considers that the 24th section of the company's Act does not regulate the price of the gas to be supplied by the Company under the Metropolis Gas Act. He is of opinion that the two sections do not relate to the same thing. The 24th section of the company's Act, which limits the price of gas to 4s., refers to gas of an illuminating quality of 12 wax candles and not of the higher illuminating quality which they are obliged to supply under the provisions of the Metropolis Gas Act, so that the 24th clause of their own Act has become inoperative by reason of having nothing to operate upon, the subject to which it relates having been abolished by the Act of 1860. The company's Act recites that they have entered into a contract with the Commissioners of Sewers to apply for an Act binding the company to supply the consumers in the City with gas at a maximum price of 4s. per 1000 feet, and that it is expedient that the powers of the company should be altered, amended, enlarged, &c., and that the same cannot be effected without the authority of Parliament. Then, section 23 prescribes the quality of the gas to be supplied by them, and section 24 limits the price. Quality and price are expressly connected in the recital, and they are in reason so intimately associated that, though there is no express reference in clause 23 to clause 24, they must be read together; and section 24 must be construed as providing that the company shall not charge more than 4s. for gas of the quality stipulated for in clause 23. Any other construction would be a virtual prohibition to the company supplying gas to any one which they could not profitably sell at 4s.—cannel gas, for instance, the reasonable price for which is considered by Parliament to be 7s. 6d. per 1000 feet. The learned counsel quotes the judgment of Lord Eldon, in the case of *Blakeman v. the Glamorganshire Canal Company*, the principle of which judgment was afterwards adopted by the Exchequer Chamber, to the effect that public Acts, like the present, are to be regarded as contracts made by the Legislature on behalf of every person interested in everything to be done under them. Applying that principle to the present case, the price which the public contracted to pay was for the thing which the company contracted to supply. If the public require something extra, the price should be extra; the company are free to stipulate for the higher quality and price, and such new contract the Legislature on behalf of the public has made by the Act of 1860. Considering this case on the broad principle applied to other Acts of Parliament, the question arises whether the 4s. rate made at a time when the Legislature had before it the cost of producing gas of the quality specified in the company's Act, and with which the public were then content, applies to gas of the greater power, which by the Act of 1860 they will now have to supply, and which, it may be, could not then, and cannot now, be supplied. The principle acted upon by the court, in *Regina v. Badcock*, seems to show that it does not, and in construing all general references in Acts of Parliament, such references must be made only as will accord with reason and right. When a provision, in its original and natural application, is limited in respect of time and place, it is to give general words of incorporation a meaning, contrary to reason to hold, they apply to it. Substitute quality for time and place, and the rate applies to the present case, and shows that, if there had been a general clause of reference incorporating the clauses of the Act of 1851 in the Act of 1860, the 4s. clause would not have applied to the new Gas Act. The Gas Act of 1860 proceeds under the assumption that the 4s. rate is inapplicable to the new quality of gas required to be supplied. It recites that the regulations to which the companies are subject are not uniform, and it is expedient that provision should be made for the due regulation of all companies, and persons supplying gas within the metropolis. By this, an intention is expressed to place all the metropolitan companies upon an equality, as far as the provisions of the Act extend. By section 3, the Act is applied to the Great Central Gas Company. By section 14, every gas company in the metropolis, is obliged, on request by the owner, or occupier of any premises in any street, &c., within 50 yards of any existing main of such company, to supply him with gas at the rate prescribed in the Act. If this clause applies in its entirety to the Great Central, in case of persons not already supplied, they will be violating the 4s. clause; but, if the words apply to the time when the application is made to the magistrate, as they probably do, the clause may be made to apply to every one, by discontinuing to supply them. It proceeds on the assumption that the persons already supplied are supplied at the rate prescribed in the Act. By section 19, every gas company may, from time to time, enter into contracts with anyone for the supply of gas. The object of this clause seems to be to relieve the companies from all restrictions of every contract, except those entered into under the Act of 1860. Section 25, provides for the supply of two qualities of gas, namely, common gas and cannel gas, thus introducing new subjects of legislation, which may be, and are, different to those of the Act of 1851. Clause 36 proceeds on the assumption that a new material is introduced by the Act. Contracts under the old Acts are to cease on the 1st of February, 1862, and, thereafter, the provisions of the new Act, in all particulars, are to apply to the companies. Until then, those provisions as to price, purity, and illuminating power, are not to apply to any company, unless such company shall elect to adopt them. Price and quality are here connected. Clause 40, regulates the price of gas. It begins by prohibiting any advance beyond 4s. 6d., and for this reason, that, having introduced a new gas, all former provisions as to price are inapplicable. But, without this clause, the public would be without legislative enactment as to price. It provides for an increase of price, if the circumstances of the company render it necessary. The Gas Clauses Act of 1847, controlled by section 2 of the Act of 1860, provides for its reduction. If the 4s. clause applies, this clause is altogether inapplicable to the Central Gas Company, and there will be much difficulty in applying other clauses. They would not be on an equality with other companies, which may be regarded as the main principle of the Act; they might be compelled to supply customers with gas at a lower rate than that prescribed by the Act of 1860, but of the quality stipulated for in that Act; they could not make contracts, &c., subject to the provisions of the Act, &c. For the above reasons, the learned counsel says, he is of opinion that the Great Central Gas Company having elected to adopt the provisions of the Act of 1860, and to supply gas of the prescribed quality, are not restrained by section 24 of their own Act from demanding, or receiving more than the rate of 4s. per 1000 cubic feet.

Deputy HARRISON said, he thought it would be better, without entering into any discussion, to refer the opinions they had just heard to the special committee, with instructions to put themselves in communication with the Great Central Company, to ascertain whether they would be willing to agree to a case for the opinion of the judges, in order at once to settle the question of law.

Dr. ABRAHAM seconded the motion, and said he could not help expressing the joy he felt at the prospect of a settlement of the gas question, without the necessity of an application to Parliament. He had great confidence in the opinion given by the senior counsel, and hoped, for the sake of the public, that the gas agitation would now be brought to a termination in a satisfactory way. The course suggested by the worthy deputy was a most judicious one, and calculated to effect the object sought. He was sure that every one who had anything to do with the gas agitation would be glad to see it brought to a close; but there was no prospect whatever of such a consummation until the question of law was settled. He very much doubted whether any compromise that might be proposed would be acceptable to the citizens of London, who desired to have their rights secured and protected by the law, and not made the subject of a temporary compromise with the gas companies.

Mr. YOUNG said, it would be impossible to get the case settled before next term. In the meantime, the application to Parliament, of which notice had been given, would not, he presumed, be proceeded with.

The CHAIRMAN said, it was a very common practice for bills to be prosecuted even till the second reading, and then withdrawn.

In reply to inquiries by Deputy ELLIOTT,

Mr. PEARSON said, he anticipated questions might be put to him, and, therefore, he had ascertained from Mr. Bovill the course which should be taken in the matter. The learned counsel cited an instance in which in eleven days an action had been brought, a case agreed upon, and the judgment of the Court of Queen's Bench obtained, under a recent Act of Parliament. Mr. Bovill also informed him that, in the present instance, two sheets of paper would suffice for counsel on both sides to write down the facts of the case, as they were all upon the face of the Act of Parliament. He (Mr. Pearson), for the sake of precaution, had put the question whether, in the opinion of the learned counsel, the necessary proceedings would be a proper application of the funds of the commissioners? The Recorder stated that, having regard to the fact that the commissioners were parties to the original

Act of Parliament, it was quite consistent with the position they occupied that they should stand forth for the protection of the Act; and that the application of their funds to such a purpose would be quite legitimate.

The motion was then put and carried.

THE CARBURATING PROCESS AND THE PUBLIC LIGHTING CONTRACT.

A memorial was presented from the Carburating Company, expressing the regret of the directors on learning the recent decision come to by the court not to use the process of the company for the public lamps of the City, and urging the court to reconsider the subject. The memorial stated that the company were prepared to undertake the contract for carburating the gas, and would guarantee a saving of 2 cubic feet per hour out of the 5 feet at present consumed in the public lamps, with the advantage of an extra amount of light, on such terms as, on the present contract price, would result in a saving to the public of at least £2000 per annum. The memorial further stated that the company had been in communication with the Chartered Gas Company, who were willing to co-operate with them in carrying out their process, and the memorialists had every reason to hope that the other companies supplying the City with gas would be equally ready to do so. The memorial contained a list of a number of thoroughfares in different parts of the metropolis where the public lamps were fitted with the company's carburators, as well as private houses. The process had been adopted at Cambridge House, the private residence of Lord Palmerston, in Piccadilly; 200 lights at the South Eastern Railway Terminus; 150 at the Great Western; 150 at the North Western; and a number at the Battersea Works of the London, Chatham, and Dover Railway had been fitted up by the company, who had also received orders from the War Department to apply their process at the Wellington and Regent's Park Barracks. Nearly all their lamps had been in use for eight months, and had given great satisfaction. Under these circumstances, they ventured to hope that the court would reconsider their decision, and make such arrangements in the ensuing contracts as would enable them to apply their process to the public lamps in the City of London.

Mr. E. CLARENCE SHEPARD, managing director of the company said, Lord Palmerston had expressed a confident opinion as to the success of the company, after the experiments which had already been made, and hoped their process would have a more extended trial. The directors had been before the board of the Chartered Gas Company, who were willing to help them in every way, and would furnish them with whatever was required in their district. They had not seen the directors of the City, or Great Central Company; but, he apprehended, there would be no obstacle on their part. The process would effect even a greater saving than £2000 a year by the adoption of 2½ feet burners. The company would guarantee the success of their plan, and were quite willing not to be paid, until such success was ascertained.

Dr. ABRAHAM: How much per lamp, would you undertake to carburate the gas for?

Mr. SHEPARD: It would be merely the cost of the naphtha—it would be difficult to say.

Dr. ABRAHAM: Cannot you give us anything like a definite idea of what it would be for each lamp?

Mr. SHEPARD: It would be 19s. out of the £5. We propose to furnish the carburator.

The CHAIRMAN: Do you mean that is what it would cost?

Mr. SHEPARD: Yes; we will undertake to do them for that.

Dr. ABRAHAM: And keep the lamps in repair?

Mr. SHEPARD: Yes; and even add to them by putting glass at the bottom, and making them ornamental.

The CHAIRMAN: Does the 19s. include lighting and extinguishing?

Mr. SHEPARD: No; it does not include that.

The CHAIRMAN: That would be simply the charge for the naphtha?

Mr. SHEPARD: The naphtha and carburating—everything connected with it.

The CHAIRMAN: So that if the present price of the lamps is 4 guineas, you would reduce it to £3. 5s.?

Mr. SHEPARD: Yes; it would be a much greater saving, because we only ask for 3 feet of gas.

Dr. ABRAHAM: Suppose the company only supply 3 feet, it would not make all that difference in regard to cost, because they not only charge for gas, but, for lighting and extinguishing, and keeping the lanterns clean during the year.

Mr. SHEPARD: They told me their charge was 15s. a year for lighting and extinguishing.

Dr. ABRAHAM: Do you consider the saving of 2 feet would be equal to 19s. a year?

Mr. SHEPARD: Very much more.

Dr. ABRAHAM: If, as the chairman says, the present price is £4. 4s., your saving of 19s. would reduce it to £3. 5s.; but, then there is 15s. to be added for lighting and extinguishing.

Mr. SHEPARD: The companies say they are allowed to charge 5 guineas for the lamps. We are quite willing to guarantee a saving of £3000 a year, and not ask for anything till you are quite satisfied.

Mr. HAYWOOD: Would the 19s. include putting up the carburators?

Mr. SHEPARD: Yes.

Mr. HAYWOOD: And how long would they last?

Mr. SHEPARD: Several years.

Mr. HAYWOOD: Then, next year, the price would not be so much as 19s.?

Mr. SHEPARD: Sixteen shillings.

The CHAIRMAN: What would be the effect of extreme change of weather?

Mr. SHEPARD: By an arrangement above the burner, we can, every night, make 30-candle gas.

The CHAIRMAN: But would not extreme changes of weather affect the naphtha?

Mr. SHEPARD: No; at Lord Palmerston's the lamps are subject to great exposure.

The CHAIRMAN said, he thought it right to inform the deputation that the court, regarding this as a subject of great importance, referred it to a committee for consideration and report. He had no doubt the committee, if they had felt at liberty, would have recommended a further trial of the process; but, in consequence of the agitation throughout the City, and the extremely unsettled state of gas matters, and seeing also that the existing contracts for public lighting would terminate in February next, thus leaving no time for preparations of this kind, the committee thought it more desirable that no alteration should be made at the present moment. The court agreed with the committee, but no opinion at all had been expressed for or against the carburating process.

Deputy HARRISON thought, if the specification for the new contract had not been prepared, it would be well to embody in it, such arrangements as would enable the court, should it afterwards be deemed advisable, to adopt the carburating process.

Mr. HAYWOOD said the specification had not been inspected by the gas companies, and there was not the slightest difficulty in so drawing it that the court might have 3 or 5 feet of gas, as they might think proper.

Deputy HARRISON thought, the proposed saving was a matter of some importance, and accordingly moved that the specification should be so framed as to allow the court to adopt the alternative, if, during the continuance of the contract, it should be considered advisable.

Deputy WHITESIDE seconded the motion, suggesting, however, that the specification should be drawn so as to admit of the consumption of any intermediate quantity of gas, and thus prevent the possibility of dispute, should the saving by the carburating process not be so great as anticipated.

Deputy ELLIOTT was willing that the experiment should be tried, but thought its universal adoption in the City should be deferred until the result of further experiments was seen. It appeared to him that the process required what would be very difficult to find—viz., care, skill, and attention, and he generally found that experiments which hinged on these requirements were practically of little use.

Mr. WALTER inquired the quantity of naphtha which each lamp would consume per week.

Mr. SHEPARD said, it would require about a pint and a half for each burner.

After some further conversation, the motion was put and carried.

THE ADVANCE IN THE PRICE OF GAS.

Mr. SAUNDERS presented a petition from the ward of Coleman Street upon this subject, and moved that it be referred to the special committee on gas for consideration.

Dr. ABRAHAM seconded the motion, and made some lengthened quotations from Mr. Shuttleworth's paper upon the supply of gas to Manchester, in support of his proposition, that it is desirable the corporation should apply to Parliament for powers to erect works and supply the citizens with gas, appropriating the profits to improvements in the City or in reduction of local taxation.

Deputy ELLIOTT said he was sure the commissioners were pretty well tired of the gas question, and he confessed that, for himself, he hardly liked to condescend to enter further upon the controversy. But, as Dr. Abraham, in referring to the gas supply of Manchester, had told only a part of the truth, he felt bound to let the court know the real facts connected with that case. The corporation of Manchester, it was true, had realized a large sum of money as profit on the gas undertaking, and had laid out a considerable portion of that profit in public improvements. But what was the fact? Why, that at Manchester they had charged, in the price of gas, an improvement-rate! The people of Manchester paid 6s. per 1000 for gas, when the people of Liverpool paid 4s. 6d.—in both instances the gas being made from cannel coal. He would not trouble the court with the figures which he had before him, but would state in brief that, during the eight years from 1845 to 1852 inclusive, the consumers of gas in Manchester paid, on the average, 5s. 4½d. for their supply; while the Liverpool people, during the same period of time, paid only 4s. 6d. Taking the real value of the gas, in both cases, to be the same, it was evident that, in addition to the price of their gas, the Manchester people had paid, during those eight years, 9½d. per 1000 as an improvement-rate. No wonder, if the Manchester authorities charged, during that time, 20 per cent. more than the gas companies at Liverpool, they could afford to lay out so large a sum in public improvements. This was a system which was generally illustrated by the phrase "Robbing Peter to pay Paul," and was a very unsatisfactory mode of carrying on a public service. The principle which the corporation of Manchester should have adopted was to supply the public with gas at the lowest possible price; and pay for their local improvements by a direct and honest rate imposed not upon the gas consumers only, but upon the inhabitants at large. There was, however, a little manœuvring and management at Manchester, but the people soon found it out, and then there was almost as fierce a struggle and opposition to this patriotic mode of supplying gas as there was in the City of London, when the old companies were charging so high a price. The Manchester gas consumers found out that they were contributing in a most unjust proportion towards the improvements of the place. The more gas the man consumed, the more he had to pay towards beautifying and embellishing the town. The poor tradesman to whom gas was a necessity was thus heavily taxed, while the man of larger income living in a private house in Manchester, was gratified to find that all these public improvements were being carried on with scarcely any contribution being required from him. The consequence was, that there was an incessant struggle going on until the price of gas was reduced from 6s. to 5s., from 5s. to 4s. 6d., and ultimately, in 1861, to 4s. per 1000 feet. That was the price at the present time; but it should be known that, for some years past, the people of Liverpool had only been paying 3s. 9d. per 1000. And even this was not the whole truth; for, not only was there this enormous difference of 20 per cent. in price during the eight years he had referred to, but, upon the certificate of a competent person, it had been shown that the quality of the gas was far superior at Liverpool to that which was supplied at Manchester. At one period, it was 25 per cent. better, notwithstanding the price was only 4s. 6d., as against 6s.; and, at a subsequent period, the corporation of Manchester made gas so badly, that it was 48 per cent. inferior to that which was supplied at Liverpool. These facts, which could not be confuted, seemed to him to settle the whole question as to the supply of gas by corporations, instead of companies. It was very easy for honourable members to make eloquent speeches out of a very small amount of material; in fact, as far as he individually was concerned, he found that, the less material he had, the grander he could discourse, and the more vehemently he could denounce. But, when he came to be in possession of a store of facts, there was an end to his high-flown periods, and he found himself compelled to talk in a less rhetorical and a more common sense style. The truth was, the whole of the statements as to the superiority of the system of the gas supply at Manchester fell to the ground the moment they were examined. It was all the entire contrary of what it was represented to be, and he hoped that, before the corporation of London entertained any notion of entering upon the supply of gas to this City, they would send commissioners down to Manchester to acquaint themselves with the real facts, and ascertain the exact amount of the gas profits. He was persuaded that they would only be profiting by the lessons of experience if they confined their attention to such services as legitimately fell within their functions as a public body, and left all such questions as those of gas and water supply to private individuals or trading companies who had a direct pecuniary interest in managing such matters economically, and with satisfaction to the community at large.

Mr. WALTER said he had received a letter from the chairman of the gas committee at Rochdale, from which he learned that the profits of the gas-works there were devoted to the improvement of the town, and that during the last year the sum so appropriated amounted to £3700.

After a few remarks from Mr. DE JERSEY, the motion was put and carried.

TUESDAY, DEC. 10.

Deputy READ presented a petition from the ward of Cripplegate Without, upon the subject of the gas supply to the City, and praying the court to take the necessary steps to get the City exempt from the operation of the Metropolis Gas Act, 1860. He moved that the petition be referred to the special committee.

Dr. ABRAHAM seconded the motion, and said the court would be surprised to learn that the Great Central Company had fallen out with their own Act of Incorporation, and were about to apply to Parliament to amend it, and make it dovetail and conform to the Metropolis Gas Act, which they had hitherto spoken of as a piece of legislation forced upon them. It was certainly remarkable, after all the commissioners had heard from the worthy alderman, the chairman of that company, to find them coming forward, at the eleventh hour, with a notice of an intended application to Parliament, in the next session, for an Act to remove doubts as to their power, under the Metropolis Gas Act of 1860, to raise and regulate the price of gas, notwithstanding the provisions of the Great Central Act, 1851, and to repeal and amend all such provisions of the last-mentioned Act as may contravene those of the said Metropolis Gas Act. When the Great Central Company came before the court originally by petition, they professed to be actuated as public men by public principles for the attainment of a public object. They stated that they were not actuated by any selfish money interest; they intended primarily to seek the public good, in the course of serving which, if any advantage accrued to themselves, it would be all very well. But, now money seemed to be the one thing needful, principle was hardly to be thought of; integrity was cast on one side, promises and engagements were entirely set at nought, and those who made such large professions of public spirit were found coalescing with their former rivals against the gas consumers of the City. The promotion of their own narrow, commercial pocket concerns seemed now their first consideration, and all their former disinterestedness was forgotten or ignored.

The motion was then put and carried.

The Special Committee reported that they had had a conference with Mr. Alderman Dakin upon the subject referred to them at the last court, and that the Great Central Company were willing that a joint case should be prepared for the opinion of the Court of Queen's Bench, as to whether the provisions of the Metropolis Gas Act overrides the provisions of the company's Act of Incorporation, in reference to the price to be charged by them for gas. The committee stated that they had instructed the City solicitor with the assistance of the Remembrancer, and in conjunction with the solicitor of the company, to prepare such case accordingly.

The report, after some conversation, was adopted.

The CHAIRMAN asked the court to sanction an application to the Common Council, that the usual practice should be adopted in reference to the intended proceedings in Parliament, viz., that the same should be prosecuted in the name of the corporation.

A resolution to that effect was accordingly passed.

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COURT OF COMMON COUNCIL, GUILDHALL, THURSDAY, DEC. 12.

At a Meeting of the Court this day—the Right Honourable the LORD MAYOR in the chair—

Deputy CHRISTIE, as chairman of the Commissioners of Sewers, brought up the following resolution of that body passed on the 10th inst.—"Resolved that this court do apply to the Court of Common Council, recommending that court to petition Parliament to introduce a bill to amend the Metropolis Gas Act, 1860." He also brought up the draft of a petition, and moved that the same be adopted, fairly transcribed, signed by the town-clerk, and deposited agreeably to the standing orders of the House of Commons; and, further, that it be referred to the Commissioners of Sewers to prosecute the bill as they may be advised, and to report thereon from time to time to this court.

The motions were agreed to.

The court then proceeded, agreeably to notice, "to appoint one or more fit person or persons to examine and audit the accounts of the Great Central Gas Company to Christmas, 1861, under the provisions of the Act 14 and 15 Vict. c. 69, and the resolution of this court of the 18th of December, 1851."

Deputy OBBARD moved that the same gentlemen be appointed as last year, as they had given great satisfaction.

Mr. YOUNG said, it was contended that the Great Central Gas Act had been repealed by the passing of the Metropolis Gas Act. If so, why should this appointment be made?

The TOWN-CLERK said he was not aware that the provision of the company's Act, in reference to the appointment of auditors by this court, was repealed.

It was then agreed that Messrs. Begbie and Chatteris be appointed auditors of the company's accounts for the current year.

Alderman PHILLIPS presented a petition from the inhabitants of the ward of Farringdon Within in wardmote assembled, praying the court to consider the question of the gas supply to the City, the propriety of an application to Parliament for an amendment of the Metropolis Gas Act, 1860, or for the exemption of the City of London from its operation, or for the erection of works to supply the City with gas. He moved that it be referred to the Commissioners of Sewers for consideration.

Mr. YOUNG seconded the motion.

Mr. WHEELER inquired how many of the inhabitants had signed the petition?

Alderman PHILLIPS: Two hundred.

Dr. ABRAHAM warmly protested against the motion, which he said was an attempt to give the go-by to the petition, and was not respectful to the inhabitants of the ward. If the petition went to the Commissioners of Sewers, this court would hear no more of it; and he would therefore move, as an amendment, that it be referred to the law and parliamentary committee for consideration and report.

Deputy READ seconded the amendment.

Alderman PHILLIPS said Dr. Abraham had, as usual, displayed his eloquence on this gas question, and, in doing so, he had made use of an expression which, to say the least, was very strong. He had charged him (Alderman Phillips) with wishing to give the "go-by" to the petition. He would tell the honourable member that he was not accustomed to mix himself up with matters which involved him in the necessity of adopting such a course. He had moved the resolution with the firm persuasion that the Court of Sewers was the proper tribunal to deal with the question; but, if the honourable member had suggested that it would be more agreeable, and perhaps suit his individual purpose more advantageously, to have it sent to the law and parliamentary committee, he (Alderman Phillips) would have been glad to fall in with his views.

Dr. ABRAHAM (with much warmth): I have no individual purposes to serve, and I consider it is a most improper observation to make. I have no interest in the question, and I protest against such remarks.

Alderman PHILLIPS said, he did not know that he had used the words; if he had done so, it was unintentional.

Dr. ABRAHAM: What do you mean by "individual purposes?"

Alderman PHILLIPS said, he did not mean to impute any unworthy motive to the honourable member. What he intended to say was, that if Dr. Abraham, instead of attacking him, and charging him with a desire to give the "go-by" to the petition, had suggested that it would be better to send it to the law and parliamentary committee, he would gladly have adopted the suggestion. He certainly had no motive to serve, but he must be permitted to state that, in his opinion, this gas question, like all other questions, had two sides to it. Up to the present time, the court had only heard one side of it. (Laughter.)

Dr. ABRAHAM: There is plenty of time for the other side to be heard upon it. (Hear, hear.)

Alderman PHILLIPS said, he had only further to observe that he had presented the petition according to the request of the inhabitants of his ward, and he was quite as desirous as any member of the court that it should go to that committee where it would undergo the most critical investigation. If he had wished as had been surmised, to give it the "go-by," he might have refused to present it, but such a course would not have been respectful to his constituents. He would refrain from going into the question of its merits or demerits, and, would, with the consent of the court, withdraw his motion, and accept the proposition that the petition be referred to the law and parliamentary committee.

Alderman DAKIN asked permission to say a few words in vindication of his personal honour. ("Time," "time.")

Dr. ABRAHAM: May I ask whether Alderman Phillips has made his reply?

Alderman DAKIN said he understood it was not a reply but an explanation. If, however, he was mistaken, he would ask the court, as a privilege, to hear a few words from him in vindication of his personal honour. The worthy Alderman (Phillips) had stated that which might justly be taken exception to, viz., that only one side of this question had as yet been heard. He (Alderman Dakin) had ventured from time to time, when in his place in this court, and also in the Court of Sewers, honestly and fairly to state his views upon it. Having done so, he would not now trouble the court at any length, remembering what his worthy and witty friend, Deputy Lott, had so well remarked in reference to Dr. Abraham's speeches that they were "the mixture as before," *usque ad nauseam*. The honourable member had before remarked that it was time the whole matter came out. He (Alderman Dakin) accepted the challenge, and would take care that a proper explanation came before the court. It was on personal grounds, however, that he now asked to be allowed to make an explanation. He had been attacked in this court and elsewhere, as a person who had been deliberately guilty of a breach of faith; and this attack was grounded upon the part which he had taken in connexion with the Great Central Gas Company. It was said that he was party to a petition upon which a deed was founded, and which was followed by an Act of Parliament, by which the company pledged themselves never to charge more than 4s. per 1000 for the gas supplied by them; but, inasmuch as they now proposed to raise the price to 4s. 6d., therefore, they were guilty of breaking faith with the public. That statement had been unhesitatingly made, and what he complained of was, that those who made it did it with a one-sided view, or with only a partial knowledge of the facts of the case, or that they kept back some of the circumstances connected with the question. (Interruption.)

Dr. ABRAHAM asked whether he should be allowed to reply to these remarks, and whether they could be considered simply as a vindication of the character of the alderman? (Hear, hear.)

The LORD MAYOR said, Alderman Dakin had requested leave to say a few words in vindication of his personal honour; but, it was not supposed that he was going to make a long statement.

Alderman DAKIN proceeded, with many interruptions, to say that he had felt it right to refer to the charge made against him in this court and in the Court of Sewers, and he would now proceed to give a statement of the real facts of the case. On the 3rd of December, 1849, the Great Central Gas Company presented a petition to the Commissioners of Sewers of the City of London, praying the court to grant them leave to lay down their pipes for the supply of the public and private lights within the City, upon their executing a deed under their corporate seal to the satisfaction of the solicitor of the commissioners, binding themselves to the conditions mentioned in the petition, and such other stipulations as the court might think necessary. On the 7th of December, 1849, the prayer of this petition was granted, and, on the 12th of February, 1850, the deed alluded to was signed by himself and another director, on behalf of the company, and by the clerk of the commissioners, Mr. Daw. By this deed, the Great Central Company agreed to embody in the bill intended to be introduced in the approaching session of Parliament all the clauses prepared and agreed to by the court for insertion in the company's bill during the previous session, with such variations as might be necessary to make them conformable to the clauses following. He called special attention to that clause, because it was one upon which there had been much misstatement.

Deputy FRY rose to order. The contents of that deed could have nothing at all to do with the vindication of the alderman.

Alderman DAKIN said he was charged with having broken faith with the commissioners, and, therefore, he was anxious to show what was the nature of the obligation under which, on behalf of the company, he then came. Without reading that clause, he would state generally that it bound the company to give gas of a higher illuminating power than that supplied in the City on the 7th of December, 1849, and he was prepared to show, if time permitted, that the Great Central Company appointed the present Master of the Mint, Professor Graham, Dr. Leeson, and Mr. Clegg, to examine the gas then furnished by the old companies, and report as to its illuminating power. The report of those gentlemen was to the effect that it was about 9½ sperm candles, which was equivalent to 12 wax candles; and the Great Central, therefore, adopted that as their minimum standard, with the consent of Mr. Tyrrell, the then solicitor to the Court of Sewers, and it was subsequently introduced into the provisions of their Act of Parliament. This was the obligation under which they came to the Commissioners of Sewers and the public, and, therefore, he asked, with what justice their accusers could charge them with a breach of faith in raising the price of gas, when a subsequent Act of Parliament imposed upon them increased obligations, and placed them altogether under different circumstances? The company contracted with the citizens to give them a specific article at a specific price, and for ten years they had done so, and even gone beyond their obligations. They had dealt fairly and honourably with the public, and, therefore, he felt they had good ground for complaint when gentlemen got up in this court, and elsewhere, and charged them with being false to their promises. He was prevented from giving a more circumstantial answer to this charge on the present occasion, but he would take care that such an answer should be given before long.

Dr. ABRAHAM said the imputation of bad faith was made upon this ground

—that, in their petition to the Court of Sewers, in 1849, the company pledged themselves that the price of gas should never exceed 4s.

Alderman DAKIN: What gas?

Dr. ABRAHAM said it was not stated—(laughter)—but it was to be brighter and purer gas than that in use at the time.

Alderman DAKIN said the Great Central Company had done so for ten years.

Dr. ABRAHAM said, the company was admitted into the City to oppose the grinding monopoly of the old companies; but they had confederated with the monopolists to raise the price, and therein consisted their breach of faith. The honourable member was proceeding to deal with the whole question of the obligations of the company under the Metropolis Gas Act, when he was called to order by

The LORD MAYOR, who thought it was not the wish of the court to go into a discussion of the matter.

The motion was then put and carried.

Dr. ABRAHAM moved—"That no director or shareholder in a company contracting with or employed by the City Commissioners of Sewers to supply gas for public lighting shall be appointed or shall continue a member of that commission; and that the resolution or resolutions of this court constituting the said commission be altered and amended accordingly." He said he had placed this notice upon the paper of business to remove any doubts upon the subject, although he had been informed that the 40th standing order of the court rendered such a motion unnecessary. That order provided that—"No member of this court, nor his partner, nor any person on his behalf, shall be a contractor for, or shall be employed directly or indirectly in any work to be performed in his business or profession for or against this City, or this court, or any of its committees or commissions, or any committee or society, the members whereof are appointed by this court; nor shall accept any order or employment of any kind from the Court of Aldermen; nor be engaged in the supply of any materials, or the sale of any goods, or the transaction of any general or professional business, which is to be paid for in any way out of the City's cash, or out of any funds held in trust by this corporation, over which this corporation, or any of its committees or commissions have any control. No member acting in contravention of this standing order, either in his own person, or by his partner, or by any other party whomsoever, shall be elected or continue on any committee or commission of this court." That in spirit this order was a protection against the evil he sought to remedy he admitted, but whether it was sufficiently explicit in terms, he was not prepared to say. Nor did he intend to discuss the point, because he should press his motion to a vote. At the present moment, Alderman Dakin, Alderman Gabriel, Deputy Virtue, and four or five other members of this court, who were also Commissioners of Sewers, were prosecuting a bill in Parliament, which the commissioners as a body were bound to oppose. On the other hand, the commissioners were promoting a bill which these gentlemen, as belonging to the Great Central Company, would undoubtedly take the same course with. It was an anomalous position to place a man in; that he should be both plaintiff and defendant in the same suit; and he could hardly suppose that the court would sanction such a principle. His motion would not affect any other persons than those which the standing order embraced, and, therefore every member of the court, unless prepared to move the amendment of the standing orders, must vote with him. No doubt it was a convenient thing for gentlemen engaged in a particular business to be able to ascertain what contracts the commissioners were contemplating in that direction. Alderman Dakin at a recent meeting of the Great Central Company told his shareholders that the gas question was under the consideration of the commissioners, and that as he was on the commission he could watch it there. He told them also that it was before a committee of the corporation, and as he was on that committee he could also watch it there.

Alderman DAKIN: I beg to state, that I made no such assertion.

Dr. ABRAHAM said, he regretted he had not the report of the meeting with him, but he would pledge himself to the substantial accuracy of the statement. The Commissioners of Sewers had a contract with the Great Central Company for the public lighting to the amount of about £8000 a year; and, if any dispute should arise as to the manner in which the duty was performed, and litigation should ensue, Mr. Commissioner Dakin would be opposed to Mr. Alderman Dakin, the chairman of the company, which would be a most anomalous and inconsistent thing.

Mr. RICHARDSON seconded the motion, and said he thought the court would suffer in the estimation of their constituents if they did not adopt it. If he were in the position of the worthy alderman, his pride would compel him to retire from such an anomalous position. It was thought by some persons that the gas question had already occupied too much of the time of the court—(hear, hear); but he could tell them that, at no distant period, it would have to come before them in a much more practical shape than it had hitherto done. He was convinced that, until the corporation followed the example of Manchester and Paris, they would never place this matter on a proper basis.

Mr. VALLANCE thought the City Sewers Act regulated the appointment of the commissioners, and he put it to the law officers of the corporation whether it was competent, by such a motion as that now before the court, to limit, and practically repeal, the provisions of the Statute?

The COMMON SERJEANT, being appealed to, said the sixth section of the Sewers Act gave power to the corporation to appoint such, and so many persons as they might think proper to be commissioners for carrying the Act into execution. A subsequent clause provided that no person interested, directly or indirectly, in any contract for works to be executed under the Act, or the supply of any materials, &c., should be a commissioner, and imposed a penalty of £100 upon every such person so acting. (Laughter.) It did not appear to him that the adoption of the motion now before the court would be any limitation of the powers of the corporation under the Act.

Alderman DAKIN said, he believed that shareholders in gas and water companies as such, did not come within the prohibition of the clause.

The COMMON SERJEANT said, it was the almost invariable practice, in modern legislation, to exclude from the operation of such a prohibitory clause, shareholders in joint-stock undertakings. In fact, the public inconvenience would be enormous unless this were the case. He did not, however, see anything to guide him to the conclusion that such an exception was made in the City Sewers Act.

After some further conversation on the point, the motion was put and carried.

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## SALE OF GAS ACT.

METROPOLITAN BOARD OF WORKS. FRIDAY, DEC. 13.

At the Meeting of the Board held this day, the estimates for the year were brought forward and agreed to. The following is the

*Approximate estimate of expenses under Sale of Gas Acts.*

| | | | |
|---|---|---|---|
| Four sites for Permanent Testing-Houses (average, £1000) | £4,000 | 0 | |
| Four Testing-Houses, (average, £1500) | 6,000 | 0 | |
| Gasholders and subsidiary apparatus | 1,500 | 0 | 0 |
| Two temporary houses | 1,000 | 0 | 0 |
| Fittings to houses (say £200 each) | 800 | 0 | 0 |
| Gas for testing | 50 | 0 | 0 |
| Salaries and wages | 1,300 | 0 | 0 |
| Coke and Coal | 24 | 0 | 0 |
| Stationery and postage | 100 | 0 | 0 |
| Alterations, repairs, and maintenance | 100 | 0 | 0 |
| Clocks | 40 | 0 | 0 |
| Law expenses and fees to district surveyors and vestries | 100 | 0 | 0 |
| Petty cash and sundries | 50 | 0 | 0 |
| | 15,064 | 0 | 0 |
| Probable amount of fees receivable for testing gas-meters during the year | 1,500 | 0 | 0 |
| | 13,564 | 0 | 0 |

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## DR. ALDIS'S REPORT
## ON THE GAS SUPPLIED TO ST. GEORGE'S HANOVER SQUARE.

FOR THE QUARTER ENDING SEPTEMBER 28, 1861.

One hundred and thirteen observations were made during the quarter upon the six gases supplied by the Chartered, London, and Equitable Companies, at the works in Horseferry Road, 73, Bessborough Street, and 78, Cambridge Street, respectively.

The gases were burned in accordance with the Metropolis Gas Act, 1860, and the illuminating power continued above the standard light, excepting on July 31st, when the common gas supplied by the Chartered Company gave a light equal to 11·90 sperm candles, while the Act requires the intensity of light to be not less than 12 sperm candles. Upon this circumstance being reported to the board, they stopped a large contract for coals then used for making the common gas, and entered into a new one.

With regard to the quality of the gases, they were free from sulphuretted hydrogen, and so far free from ammonia that they did not discolour the turmeric paper exposed under a pressure of five-tenths of an inch of water, exclusive of the common gas from the London Company, which presented traces of it during the first part of the quarter, but only very slight traces in the month of September. The amount of sulphur in the cannel gas from the same company was considerably diminished—the result of two determinations commenced on Sept. 28, producing only 3·862 and 3·352 grains in each 100 cubic feet of gas.

The following table gives the average light in sperm candles of all the gases:—

| | Chartered. | London. | Equitable. |
|---|---|---|---|
| Cannel | 25·09 | 24·58 | 24·78 |
| Common | 13·587 | 15·22 | 15·42 |

A table and summary were sent with each monthly report on the gas to the vestry, containing the number of examinations with the dates, and the maximum and minimum light, with the weekly and monthly average illuminating power.

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## ON KEROSOLENE.

By EDWARD PARRISH.

[From the *American Journal of Pharmacy.*]

Some of the most useful scientific and practical discoveries have originated in accidents, the first results of which have involved disappointment or inconvenience. To evolve from these the lessons by which they may be made to subserve useful ends, should be one of the chief aims of the experimentalist.

To the accidental anæsthetic effects produced upon a workman employed to clean a cistern in a kerosene oil-work in Boston, we owe the recent discovery of a new use for an abundant product of the destructive distillation of coal. This product, though heretofore procured in a crude condition at a certain stage of the process, in the works alluded to, and perhaps in others, has not until recently been rectified and thrown into the market, because no demand existed for it for any known use of which it was capable.

With the enterprise so characteristic of New England character—a trait which so happily gave to science and humanity one of the greatest blessings of modern times—ether as an anæsthetic—the Boston physicians have taken measures to investigate the utility of this article for similar purposes, pending which it naturally claims the attention of pharmaceutists in its physical and chemical characters.

Two bottles of the liquid have been sent me, the first by a medical friend residing in Massachusetts; and the second, at my request, by the manufacturer, Joshua Merrill, superintendent of the Downer Kerosene Oil Company, from whom I learn that kerosolene, as it is named, is a product of the destructive distillation of "Albert coal," at temperatures varying from 600° to 890° Fahr. The very volatile portion, separated by careful fractional distillation from the more fixed products, which are sold as kerosene, is purified so as to remove its unpleasant odour, and thoroughly rectified.

As thus produced, kerosolene is a tasteless, colourless, though highly refractive, inflammable liquid, burning with a bright, smoky flame. It is very mobile and volatile, and the bead disappears immediately. A vial, when grasped by the palm of the hand, gives off small bubbles of vapour, raising the stopper. Its odour is very faint, reminding of chloroform at first, though less agreeable as it evaporates, leaving not the slightest odour when it dries. Its specific gravity varied in the two specimens at first received, that of No. 1 being ·6346, at 76° Fahr.; of No. 2, ·6325, at 72° Fahr.; but, by exposure for two weeks in a partly-filled tincture bottle, occasionally opened, the specimen marked No. 1 reached a specific gravity of ·6420, at 72° Fahr.

From the last-named fact, and its known origin and mode of preparation, it would be supposed that this liquid had not a uniform composition, but must be a mixture of different carbohydrogens of varying density and volatility. The truth of this was proved by the following experiments:—Specimen No. 1 was heated in a water-bath, and its boiling points carefully noted. At 84° Fahr., it commenced to boil, the temperature rapidly rising to 90°, and afterwards slowly, without becoming stationary, to 150°, when boiling ceased, about one-sixth of the original liquid remaining, which was evaporated at about 200° without boiling. Specimen No. 2 was subjected

to similar experiments. It commenced to boil at 82° Fahr., ceased at 94°, recommenced at 100°, and ceased at 105°, when the remainder, about two-thirds, was evaporated without boiling, at a temperature not exceeding 180°.

The extremely low specific gravity of this substance, and the temperature at which it begins to boil, forbid the idea of its containing the ordinary coal-tar products in considerable proportion. The light naphtha first obtained in the distillation of coal-tar has a specific gravity, according to Mansfield, of ·900 to ·950; and, when purified by agitation with sulphuric acid and potash, or by the process of Gregory, in which peroxide of manganese is used and rectified, its density does not fall below that of benzine, the specific gravity of which, in its liquid form, is variously stated at ·85 and ·8991, at different temperatures.

The largest proportion of kerosolene is evidently composed of those very light carbohydrogens not present in coal-tar, and not produced at the high temperatures employed in the production of illuminating gas.

In the books I have consulted, I find no detailed account of these almost gaseous liquids, and I can imagine no subject presenting more difficulties to the chemist. Professor Antisell, in his thoroughly practical work on "Photogenic and Hydrocarbon Oils," remarks that "the specific gravity and chemical constitution of the light and heavy oils vary in relation to the temperature at which they are distilled; and, perhaps, no two distillations give exactly the same relative mixture of the various hydrocarbons of which they are composed." The composition of these is further varied by the nature of the crude materials, which may be highly bituminous, like the "Albert coal," from which the specimens under consideration were obtained; or more completely formed coals, like the more common varieties.

The proportion of matter volatile at redness in the "Albert coal" has been stated at 61·74 per cent.; that of the "Breckenridge coal," of Kentucky, at 66·27 per cent.; while Pittsburgh coal yields but 32·95 per cent.

Chemists have obtained from coal-tar, by fractional distillation, several substances of great utility. Of these, benzine or benzol, $C_{12}H_6$, which, as before stated, is the chief constituent of the light naphtha, is also a constituent of kerosolene, as ascertained by testing it with nitric acid, which developed the odour of nitrobenzol. The chief constituents of the photogenic liquids, as thrown into commerce under the name of coal-oils or kerosolene, are, toluol, $C_{14}H_8$; which has a specific gravity of ·870, and boiling point 237° Fahr. (Gerhardt, 230°); and cumol, $C_{18}H_{12}$, which is also lighter than water, and boils at 314°. It is not improbable that traces of these may be present in the new liquid, though they vary from it so much, both in specific gravity and boiling point. Experiments to detect aniline, $C_{12}H_7N$, in the specimens under examination failed to indicate it, as might be anticipated, its specific gravity being stated at 1·020, and the process of rectification with sulphuric acid being adapted to separate any alkaloids if originally present.

Compared with the commercial article of benzol, now so extensively sold, kerosolene presents several marked points of difference. Three specimens of benzol I have examined, have respectively, at 60° Fah., the specific gravity of ·7521, ·7661, and ·8708. These differ in sensible properties from each other almost as much as they do from kerosolene. The most agreeable in odour I imported from England, at a much higher price than that paid for the American varieties, which I have generally found disagreeably "balsamic," sometimes resembling impure illuminating gas, and leading to the belief that the gas was escaping into the room. One specimen became almost intolerable from age, while the colour became gradually yellow. Kerosolene, as before stated, is almost free from odour; it is so very mobile, light and colourless, that it could not be mistaken for benzol, and still less or kerosene, its properties having relation to the latter substance, not unlike those of ether to oil of turpentine.

Under the name of Eupion, chemists formerly described a product of the destructive distillation of wood, which was believed to be $C_5H_6$; but, it has since been shown by Voelckel that the portions rising below 212° Fah., consisted chiefly of acetate of methyl with acetone, a little benzol, xylite, and mesite.

The specific gravity of eupion was stated at ·665, its boiling point at 118° Fah., rising as high as 336° in some samples. Though stated to be the lightest of known substances, it will be seen that this product was rather more dense than our new carbohydrogen product. Accounts differed in regard to its miscibility with water and alcohol. It was, however, described as freely miscible with ether and oils, and, as being of a faint and agreeable odour and without taste, which properties correspond with those of the liquor under consideration. That kerosolene contains no more than a slight trace of any oxygenated body was shown by immersing sodium in it; a fresh surface of the metal was only slightly tarnished by the contact.

The solvent properties of this new substance are of course of primary importance. They appear to me to present the true key to its usefulness. It dissolves fixed oils, apparently, in all proportions, common resin freely, though with flocculent residue, wax, and cocoa-butter freely, mastic and caoutchouc slightly. It mixes freely with alcohol, oil of turpentine, ether, and chloroform, but not with water. Iodine dissolves in it sparingly, yielding a remarkably rich, though changing, purple colour.

For the common uses to which benzol is now applied, kerosolene appears to be equally adapted. By the absence of disagreeable odour it is rendered generally preferable. It is, however, unsuited to the purposes of illumination, or to generating heat, being too volatile, though its vapour does not appear to be explosive. Its extreme volatility makes it important that it should be excluded from the kerosene or other photogenic oils, and renders it a residuary product, heretofore without value, of those works in which it has been produced in a crude condition.

How far this product could be furnished by the manufacturers, of uniform quality, or whether it could be produced at other kerosene works, and by those numerous establishments in which the so-called rock-oils now pumped in such vast quantities in the western slopes of the Alleghanies, are rectified, is a practical question yet to be tested. Its relations are evidently to this class of bitumens rather than to coal-tar.

In view of its use in medicine, the fact of the great uncertainty of its composition, its being a mixture of different and undetermined proximate constituents, must interfere with its general adoption and recognition.

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DR. J. NORTHCOTE VINEN'S REPORT ON THE GAS SUPPLIED BY THE SURREY CONSUMERS COMPANY:—

| 1861. Week ending. | Number of Observations. | Maximum Light. Candles. | Minimum Light. Candles. | Average Light. Candles. |
|---|---|---|---|---|
| Dec. 7 | 4 | 13·43 | 11·48 | 12·36 |
| „ 14 | 4 | 12·67 | 12·32 | 12·51 |

The volume of hydrocarbons averaged 4·25 per cent.; carbonic acid, 0·87 per cent. There was no evidence either of sulphuretted hydrogen or of ammonia. The maximum pressure was 3 inches and 3/10ths; the minimum, 7/10ths; the average pressure was 1 inch and 4/10ths.

A TOWN IN DARKNESS.—In consequence of a leakage in the large main pipe which conducts the gas from the works in the marsh, under the river Medina, into the town of Newport, in the Isle of Wight, the inhabitants at large have been subjected to very great inconveniences during three days, for want of this domestic and business-like accessory, and the rush and rummage for candle-ends, and obsolete chandeliers, oil-wicks, and candlesticks, have been tremendous, the more especially as the latter articles, like the ancient tinder-boxes, have long since been consigned to *limbo* in many establishments! On Sunday evening, the 8th inst., when the chandlers shops were closed, those who could neither buy, borrow, beg, nor otherwise procure a few *glims* for the evening, were necessitated to devour their suppers by firelight, and then retire to their beds in the dark. The various places of worship, too, were put to many awkward shifts to enlighten their different congregations, but, by the loan of a supply of moderator lamps, and candles of all *calibres*, and the attendance of the members with lanterns of all sizes and of all descriptions, the wants were partially remedied, though the collect, "Lighten our darkness," was never before, we believe, so truly applicable. Luckily, the moon lent her aid in illuminating the streets and alleys, or the thoroughfares would have been plunged in total darkness, without the power of supplying the deficiency, and no doubt but that many accidents would have happened in consequence. On Monday evening, many of the principal shopkeepers were compelled to close their establishments at five o'clock, for the want of sufficient light to carry on their different businesses with. The cause of the interruption was discovered on Monday, when a large hole of 20 or 25 inches in area was traced in the main-pipe, laid 20 inches below the surface of the bed of the river, through which a stone had been forced, most probably by a lighter loaded with coal lying athwart it.

# Price Current.

## CASTINGS.—*Per Ton.*

*Average Weight of Cast-iron Gas-pipes, per Yard.*

| 1¼ in. | 2 in. | 2½ in. | 3 in. | 4 in. | 5 in. | 6 in. | 7 in. | 8 in. | 9 in. | 10 in. | 12 in. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 21 | 28 | 33 | 51 | 70 | 89 | 107 | 126 | 149 | 177 | 208 lb. |

| Retail Prices are 5 to 10 per cent. higher. | London. | | | Glasgow. | | | Newcastle | | | Wales. | | | Yorkshire, Derbyshire, and Staffordshire. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | £. | s. | d. | £. | s. | d. | £. | s. | d. | £. | s. | d. | £. | s. | d. |
| Pig Iron, No. 1 | 3 | 5 | 0 | 2 | 10 | 0 | 2 | 12 | 6 | 3 | 0 | 0 | 3 | 5 | 0 |
| 1¼ and 2-inch Socket pipes | 7 | 0 | 0 | 6 | 0 | 0 | 6 | 5 | 0 | 6 | 10 | 0 | 6 | 15 | 0 |
| 2½ and 3-inch ditto | 6 | 10 | 0 | 5 | 10 | 0 | 5 | 15 | 0 | 6 | 0 | 0 | 6 | 5 | 0 |
| 5 and 5-inch ditto | 6 | 0 | 0 | 5 | 0 | 0 | 5 | 5 | 0 | 5 | 10 | 0 | 5 | 15 | 0 |
| 6 inches and upwards ditto | 5 | 15 | 0 | 4 | 15 | 0 | 5 | 0 | 0 | 5 | 0 | 0 | 5 | 10 | 0 |
| Retorts, 1st fusion, hot blast | 5 | 10 | 0 | 4 | 10 | 0 | 4 | 15 | 0 | 5 | 0 | 0 | 5 | 5 | 0 |
| Ditto, 2nd ditto, cold ditto | 6 | 10 | 0 | 5 | 5 | 0 | 5 | 10 | 0 | 6 | 0 | 0 | 6 | 5 | 0 |
| Tank-plates, ⅜ thick and above | 6 | 0 | 0 | 5 | 0 | 0 | 5 | 5 | 0 | 5 | 10 | 0 | 5 | 10 | 0 |

## WROUGHT-IRON TUBING,

*Subject to 40 per cent. Discount.*

| | 2 in. | | 1½ in. | | 1¼ in. | | 1 in. | | ¾ in. | | ½ in. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. |
| Patent Welded Tubes, from 2 to 12 feet—per foot | 1 | 8 | 1 | 0 | 0 | 10 | 0 | 7 | 0 | 5 | 0 | 4½ |
| Ditto ditto, from 6 inches to 18 inches—each | 3 | 0 | 2 | 0 | 1 | 9 | 1 | 3 | 1 | 0 | 0 | 9 |
| Connecting-pieces, or Long Screws | 3 | 6 | 2 | 3 | 2 | 0 | 1 | 6 | 1 | 2 | 0 | 11 |
| Bends, Springs, and Elbows (wrought iron) | 3 | 9 | 2 | 3 | 1 | 9 | 1 | 0 | 0 | 10 | 0 | 8 |
| Tees, wrought or cast | 4 | 0 | 2 | 6 | 2 | 0 | 1 | 6 | 1 | 1 | 0 | 10 |
| Crosses, ditto | 4 | 6 | 3 | 0 | 2 | 6 | 2 | 0 | 1 | 6 | 1 | 2 |
| Iron Cocks | 17 | 6 | 9 | 6 | 7 | 6 | 4 | 6 | 3 | 3 | 2 | 6 |
| Ditto, with brass plug | 28 | 0 | 16 | 0 | 13 | 0 | 7 | 0 | 5 | 6 | 4 | 6 |
| Diminishing Sockets, Caps, Plugs, and Nipples | 1 | 3 | 0 | 9 | 0 | 8 | 0 | 6 | 0 | 5 | 0 | 4 |
| Plain Sockets | 1 | 0 | 0 | 8 | 0 | 7 | 0 | 5 | 0 | 4 | 0 | 3 |
| Syphons, 2-quart | 15 | 0 | 14 | 0 | 13 | 6 | 13 | 0 | 12 | 0 | — | |

## COALS.—*Per Ton.*

| *Newcastle.—Unscreened.* | | *Scotch Cannel.* | |
|---|---|---|---|
| Whitwell Primrose | 6s. 9d. | Boghead (at Leith) | 45s. 0d. |
| Medomsley, Eighton Moor, and Burnhope | 7 0 | Kirkness, best | 23 0 |
| Pelaw | 7 3 | Capeldrae, 1st quality | 20 0 |
| New Pelton, Peareth, South Pelaw, Washington Hutton, and South Peareth | 7 6 | Ditto, 2nd ditto | 12 6 |
| Pelton | 7 9 | Lesmahago (at Glasgow) | 25 0 |
| Ramsay's Newcastle Cannel | 16 0 | Ditto (at Leith) | 27 6 |
| | | Arniston | 27 6 |
| | | Wemyss | 20 0 |
| | | Knightswood | 18 0 |
| | | Pirnie | 14 0 |

## FREIGHTS.

| *Coastwise—Newcastle.—Per Ton.* | | *Foreign.—Per Keel.* | |
|---|---|---|---|
| Chatham and Rochester | 6s. 9d. | Barcelona | £26 0s. |
| Cork | 11 3 | Bordeaux | 17 10 |
| Dover and Folkestone | 7 6 | Boulogne and Calais | 9 0 |
| Dublin | 11 9 | Cadiz | 17 10 |
| Exeter Quay | 10 3 | Cronstadt | — |
| Ipswich | 6s. 9d. to 7 0 | Copenhagen | 10 10 |
| London (Pool) | 6 9 | Genoa | 26 0 |
| Lowestoft and Yarmouth | 5s. 6d. to 6 0 | Hamburg | — |
| Lynn | 6 3 | Havre de Grace | 11 0 |
| Portsmouth and Southampton | 8 6 | Leghorn | 24 0 |
| Plymouth | 10 0 | Lisbon | 17 10 |
| Shoreham | 8 3 | Rotterdam | 13 10 |
| Whitstable | 7 0 | Stettin | 11 0 |
| Weymouth | 9 0 | Trieste and Venice | £22. to 24 10 |

## SUNDRIES.

| | | | |
|---|---|---|---|
| Best Newcastle Fire-bricks—per 1000 | £2. 10s. to | £2 | 15s. 0d. |
| Cliff's Fire-bricks (at Wortley)—per 1000 | | 2 | 15 6 |
| Ingham's ditto (at Wortley)—per 1000 | | 2 | 15 0 |
| Fire-clay Retorts—per foot run | 5s. 6d. to | 0 | 7 0 |
| Tough Cake Copper—per ton | | 107 | 10 0 |
| English Pig Lead—per ton | | 20 | 0 0 |
| Welsh Bar Iron (in London)—per ton | | 6 | 5 0 |
| Foreign Spelter—per ton | | 17 | 15 0 |
| English Block Tin—per ton | | 120 | 0 0 |
| Banca—per ton | | 120 | 0 0 |
| Tarred Rope Yarn—per cwt. | | 1 | 6 0 |

**BOOKS under the Sales of Gas Act,** 22 and 23 Vict., c. 66. Drawn by GEORGE GLOVER, Esq., and Settled by T. L. MARRIOTT, Esq., 22, Parliament Street, London.

Register Book, Store-Room Book, Testing-Room Book, Redelivery Book, and Inspector's Certificate.

Prices, half-bound, 10s. each. Certificate, 2s.

London: SHAW and SONS, FETTER LANE.

**TO the Benevolent and Humane.**—The undersigned, who is 74 years of age, and has been engaged for about 30 years by several of the Metropolitan Gas Companies in the capacity of Inspector, Surveyor of Mains, and Collector, has recently undergone a surgical operation in the hope of regaining his sight, which he had completely lost by Cataract; and, in order to provide for the expenses incurred, which are totally beyond his means, he is compelled to appeal to the generous hearts of his former Brother Officers and Superiors to lend him a helping hand in this sad affliction, and to assist him in recovering one of God's greatest blessings. To those Gentlemen who have generously assisted him during the last twelve months, he tenders his most grateful thanks. The Editor of the JOURNAL OF GAS LIGHTING is acquainted with the particulars of the case, and has kindly permitted reference to be made to him; and it is hoped that the young and able will send their mite to assist in alleviating the sufferings of an old Member of the Profession.

JOSEPH WAKEMAN.

No. 2, Upper Johnson St., Holywell St., Westminster, December,, 1861.

The following subscriptions are gratefully acknowledged:—

| | | | |
|---|---|---|---|
| Mr. Croll | £2 | 0 | 0 |
| Mr. J. B. Murray | 2 | 0 | 0 |
| Mr. C. Hood | 1 | 0 | 0 |
| Mr. T. Kirkham | 1 | 0 | 0 |
| Mr. R. Harris | 1 | 0 | 0 |
| Mr. G. Lowe | 10 | 0 | |
| Mr. Thomas Glover | 10 | 0 | |
| Mr. W. Scoble | 5 | 0 | |

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Old Barge Iron Wharf, Upper Ground Street, LONDON.

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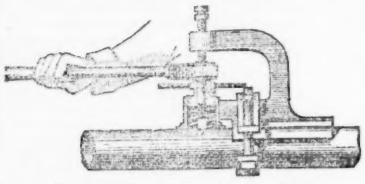
FOR GAS AND WATER-MAINS.



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No. 2.—RATCHET-BRACE, DRILL-POSTS, CLIPS, BOLTS, TAP-DRILL, & NUT, for 1¼ and 2 ins., 10 6 0

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BRYAN DONKIN & CO., ENGINEERS,
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**GLOBE LIGHT.**

A SHADOWLESS GAS-BURNER.

AGAR STREET, STRAND, LONDON, W.C.

**LEONI'S Patent** ADAMAS GAS-BURNERS are entirely free from liability to Corrosion, Injury from Heat, or danger of Fraction, and are *unalterable* in the dimensions of their Apertures. Uniformity in the consumption of gas is obtained by the process of manufacture, which insures that the burners shall be precisely similar in pattern.

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GAS ENGINEERS, &c.,
**London Gasholder and Boiler Works,**
8, WHARF, WENLOCK ROAD, CITY ROAD, N., LONDON.

Rye, Nov. 12, 1860.

Dear Sirs,—I consider it incumbent on me to acquaint you that the alterations recently made on the Rye Gas-Works—viz., the addition of a NEWLY-IMPROVED WASHER, and other work for the Purification of Gas, executed by the experienced workmen under your able supervision—are perfectly satisfactory to the Company, and the Gas is now as pure as it can be made.

I am, dear Sirs, your obedient servant,
CHARLES THOMAS, Superintendent,
Rye Gas-Works.

Messrs. Cutler and Co.

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GAS ENGINEERS,
WHITESTONE IRON WORKS, HUDDERSFIELD.

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Contractors for the Erection of Gas-Works throughout of any magnitude.

Plans, Specifications, and Estimates prepared.

Makers of the Combined, Condensing, and Purifying Apparatus (especially adapted for exportation), uniting simplicity and compactness with great efficiency and facility of working.

References given to Works where it is in operation.

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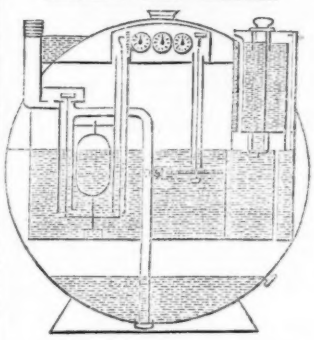

# N. DEFRIES,

CONSULTING GAS ENGINEER,

**Inventor and Patentee**

OF

## WET GAS-METERS,

WITH SELF-ADJUSTING WATER-LINE;

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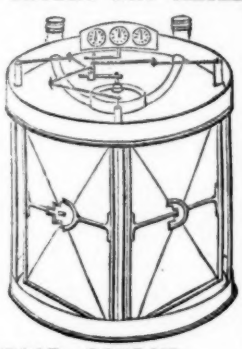
GAS-HEATING BATHS, OVENS, STOVES,

GAS FIRES with **INDESTRUCTIBLE FUEL,**

*&c., &c.*

PATENT DRY METER



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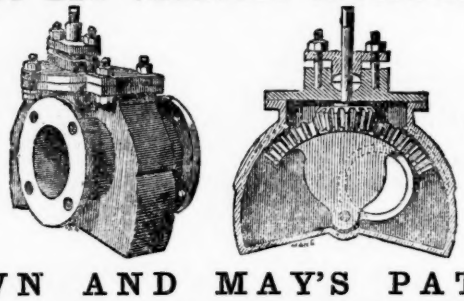

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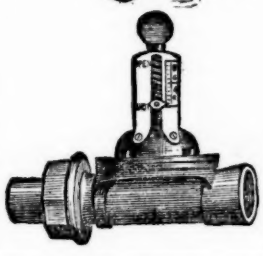

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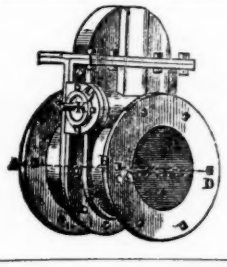

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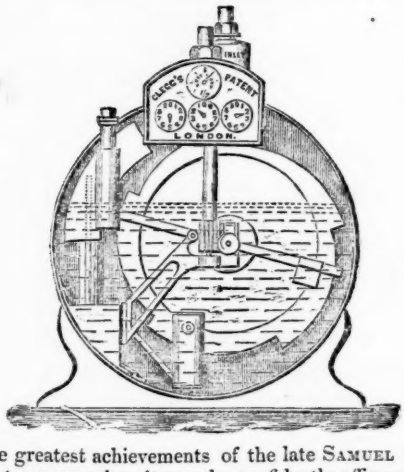


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This Meter is constructed on an entirely new principle, and, when once adjusted, will always remain the same under all circumstances. The quantity or height of the water in it has no effect on its *capacity*. The immense importance and economy of this to Gas Companies who are obliged to employ so many inspectors, is so obvious, that they will be able to appreciate its advantages over all other Wet Meters, where the varying height of the water regulates the capacity.

The Drum, from its peculiar construction, presents scarcely any resistance when moving through the water; and, its weight being taken off its axis by an air vessel, it revolves with the slightest pressure.

The comparative absence of friction in the Drum reduces the wear and tear, and enables it to be made of the strongest materials, which will keep it in working order longer than any other Meter.

It is approved and adopted by the principal London and Country Gas Companies, and is guaranteed to comply with the "Sale of Gas Act," as this Meter, beyond all doubt, works within a shorter range of registration than any other Meter manufactured.

CROSLEY & GOLDSMITH'S

**PATENT SELF-ADJUSTING & COMPENSATING GAS-METERS**

**CANNOT BE OVER OR UNDERCHARGED WITH WATER,**

and they consequently register the quantity of Gas consumed with greater accuracy than Meters in which the Water-Line is variable

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**(Late CROSLEY & CO.,)**

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N.B. The Patent Self-Adjusting and Compensating Apparatus may be applied to the ordinary Meter.

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I. BRIGGS is also prepared to supply Gas Companies and others with

**DUPLICATES of Mr. KING'S CUBIC FOOT TRANSFERRER,**

similar to that manufactured by Crosley & Co., and verified by the ASTRONOMER-ROYAL, and PROFESSOR MILLER, of Cambridge, on behalf of the Government, which was deposited by them in the Office of the COMPTROLLER-GENERAL of the EXCHEQUER, before Nov. 13, 1859, in compliance with the "Act for Regulating Measures used in Sales of Gas." He also supplies

**TEST GASHOLDERS,**

*Graduated by the Standard Cubic Foot.*

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**FOR GAS AND WATER-MAINS, AND STEAM PIPING,**

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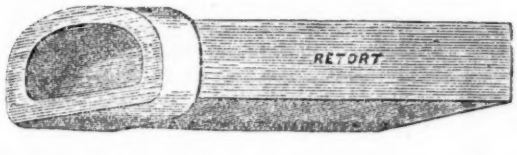


KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

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ESTABLISHED IN 1795.

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